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OBSERVATIONS ON THE VENOM OF THE SYDNEY FUNNEL-WEB SPIDER (*ATRAX ROBUSTUS*).

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SINCE 1927, at least ten fatalities have occurred in Australia from the bite of the funnel-web spider, *Atrax robustus*. The last of these occurred in April, 1961, when a woman, aged 60 years, died five hours after a bite by a male spider. A list of all fatalities which could be traced is shown in Table I. Details of two of these have already been published (Beazley, 1930; Ingram and Musgrave, 1933).

From the clinical evidence available so far, only the male spider appears to be capable of inflicting a lethal bite in man. This inference is in accord with the observation that in laboratory animals the venom of the male spider is considerably more toxic than that of the female spider (Wiener, 1959). However, because of the variable factors which operate when an injury by any venomous animal is sustained, not all bites by a male spider need be fatal. The record is available of one adult who was bitten by a male spider and suffered no ill effects beyond two puncture marks at the site of the bite. Nevertheless, a bite by a male funnel-web spider, and—since the sex of the spider is

often not identifiable—a bite by any funnel-web spider, must be regarded as a serious event.

Since no specific antivenene is available, or is likely to become available, for reasons which are presented below, the treatment of human cases of envenomation will remain unsatisfactory until a pharmacological antagonist is found which will neutralize the toxic effects of venom. For this, a knowledge of the properties and actions of venom is required. Some of these have been published previously (Wiener 1957, 1959).

Because of the diverse nature of the studies which were undertaken, they are presented here in several sections, which include material usually relegated to the "Discussion" at the end of a paper.

MATERIALS.

Venom was obtained by "milking" spiders as described previously (Wiener, 1957). The venom was freeze-dried and dissolved in normal saline solution or in distilled water as required. Most of the experiments to be described were carried out with the venom collected from female spiders. However, whenever a sufficient amount of male spider venom had accumulated, it was also used.

Unless otherwise stated, all toxicity studies were carried out in mice weighing 15 to 20 grammes.

CHEMICAL AND PHYSICAL CHARACTERISTICS OF VENOM.

Chemical Reactions of Venom.

A solution of venom gave positive reactions with reagents which detect the presence of proteins and their derivatives. Thus, it was precipitated by strong mineral acids, gave a

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TABLE I.
List of Fatal Bites of *Atrax Robustus* Since 1927.

Number.	Date.	Time.	Place.	Age of Victim (Years).	Sex of Victim.	Site of Bite.	Interval between Bite and Death.	Sex of Spider.	Drugs, etc., Used for Treatment.
1	15.12.1927	8 p.m.	Outdoors.	2	Male.	Finger.	90 min.	Male.	—
2	31. 3.1929	5 p.m.	Outdoors.	5	Female.	Not recorded.	80 min.	Not identified	—
3	12. 1.1930	8.30 a.m.	Indoors. ¹	47	Female.	Thumb.	11 hr.	Male.	Pituitrin, adrenaline, camphor in oil, glucose-saline solution by rectum, atropine.
4	7. 1.1933	11.30 p.m.	Outdoors.	26	Female.	Buttock.	12 hr.	Not identified.	Atropine, morphine, oxygen.
5	26. 1.1949	9 a.m.	Indoors. ¹	14	Male.	Toe.	12 hr.	Male.	Atropine, adrenaline, strychnine, hyoscine, paraldehyde, oxygen.
6	31.12.1951	5 p.m.	Outdoors.	8	Female.	Finger.	23 hr.	Not identified.	"Coramine" and other "stimulants".
7	16. 1.1953	10 a.m.	Outdoors.	7	Male.	Finger.	90 min.	Not identified.	Atropine, "Coramine", iron lung.
8	5. 6.1958	5.30 p.m.	Outdoors.	2	Female.	Not visible.	15 min.	Not identified.	—
9	26.12.1958	1 p.m.	Outdoors.	15/12	Male.	Both hands.	90 min.	Male.	Aminophylline, "Antistine", phenobarbitone, saline with "Soluocortef" by intravenous injection.
10	22. 4.1961	11 a.m.	Indoors. ²	60	Female.	Finger.	5 hr.	Male.	"Largactil", atropine, adrenaline, ACTH, glucose-saline with "Soluocortef" by intravenous injection.

¹ Spider was in a shoe.

² Spider was under a face-washer in the laundry.

positive reaction with Millon's reagent and positive xanthoproteic and biuret reactions, and when it was heated with ninhydrin, a blue colour was produced.

A carbohydrate was also detectable in venom. Before hydrolysis with acid, a solution of venom gave a weak positive reaction with alphanaphthol and sulphuric acid (Molisch test), but after hydrolysis, a strongly positive reaction was obtained. Tests for desoxycarbohydrate and for carboxylic acid (-COOH group) gave positive results.

Dried venom was insoluble in fat solvents and did not lose its toxicity after extraction with ether. An aqueous solution of venom was precipitated by 80% alcohol, and the precipitate readily dissolved in water and retained its toxicity, provided that it was not allowed to remain in contact with alcohol for longer than a few hours.

In addition to sodium, phosphorus, magnesium and calcium, a number of trace metals were detectable both in venom and in the body extract of the spider. Chromium and titanium were detectable in venom, but not in the body extract. Venom contained 0.37% of inorganic phosphorus, whilst after hydrolysis 0.54% of phosphorus was present.

When a few drops of concentrated sulphuric acid were added to dried venom containing a small amount of resorcinol, an olive-green colour was produced on the surface of the venom particles. This colour reaction was characteristic of the venom of *A. robustus*. It was not given by various snake venoms, by stone-fish venom or by the venom of the red-back spider. It is possible that this colour reaction is due to the presence of dicarboxylic acids or their compounds in venom. These substances form dyes when heated with resorcinol and concentrated sulphuric acid (Feigl, 1956) which fluoresce, especially in ultra-violet light. However, the compound produced with venom showed no fluorescence.

Another characteristic reaction of venom was its ability to precipitate a number of dyes from solution. These included Congo red, Evan's blue, trypan blue and nigrosin.

The precipitation of Congo red by venom could be used to detect the presence of venom in a concentration of 0.01% or higher. The precipitate which formed was red in colour, and in the presence of excess venom the supernatant solution was colourless. The precipitation of Congo red by venom was almost quantitative in nature, and could be used to determine the approximate concentration of

venom in solution. It was found that 0.1 mg. of venom completely precipitated 0.08 to 0.09 ml. of a 1% solution of Congo red.

The precipitate which formed with Congo red contained the toxic fraction of venom. In one experiment, an excess of Congo red was added to a solution containing 5 mg. of venom. The supernatant solution, which was slightly pink in colour, was not toxic when injected into a mouse by the intravenous route. When the redissolved precipitate was injected into mice, the animals died with signs typical of venom intoxication.

The venoms of both male and female spiders were indistinguishable on the basis of their chemical reactions.

The pH of Venom.

In a number of species of South American spiders, Vellard (1936) has observed that the reaction of venom and, to a lesser extent, that of the blood (haemolymph) was affected by the ambient temperature. In warm weather the reaction of venom was usually alkaline, whilst in cold weather it frequently became acid. Vellard also observed that "alkaline" venom was more toxic than "acid" venom.

In the case of *A. robustus*, both liquid venom as ejected by the spider and an aqueous solution of dried venom had a pH which ranged from 4.5 to 5.0. This acid reaction was as constant and as characteristic a feature of venom as its toxicity. It did not change with the season of the external temperature, which ranged from 60° to 102° F. It was also uninfluenced by the state of nutrition, sex and size of the spider.

When a solution of venom was dialysed, or after alcohol precipitation, the toxic fraction of venom retained its original acidity. Similarly, after venom had been separated into various fractions by electrophoresis, one group of toxic components was strongly acid in reaction.

When toxicity studies were carried out with a solution of venom buffered at pH 7, the general toxic effects and the lethal dose of venom in mice were the same as those produced when an aqueous solution of venom was injected. However, in guinea-pigs and mice, the pain produced after a subcutaneous injection of a venom solution buffered at pH 7 appeared to be less severe than when "acid" venom was used.

Ultra-Violet Absorption by Venom.

The ultra-violet light absorption curve of an aqueous solution containing 0.1% venom and that of a solution containing the same amount of material extracted from the body of the spider are shown in Figure 1.

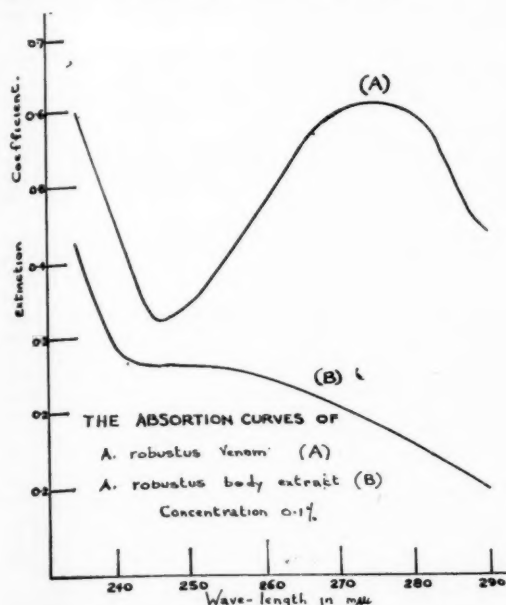


FIGURE 1.

The absorption curves of *A. robustus* venom (A) and *A. robustus* body extract (B). Concentration 0.1%.

The venom showed maximum absorption in the region of 275 mμ. The absence of a sharp peak indicates that several components with different and overlapping absorption maxima were present in venom. Tyrosine and tryptophane have a maximum absorption around 280 mμ, whilst purine and pyrimidine components have a maximum absorption in the region of 260 mμ (Davidson, 1957). It is probable that the presence of small amounts of these latter compounds caused maximum absorption to occur at a wave-length which was lower than that of a "typical" protein.

The presence in venom of phosphorus and of a desoxy-carbohydrate to which reference has been made earlier suggests that venom contains nucleic acids. In the salivary gland secretion of a snail (*Helix*), desoxyribonucleic acid, normally confined to nuclei, actually appears to be used in the manufacture of cytoplasmic secretion (Leuchtenberger and Schrader, 1952). The venom of a South American spider (*Phoneutria fere*) also contains phosphates and a pentose sugar (Fischer and Bohn, 1957).

Dialysis of Venom.

Most of the toxic components of venom passed through "Cellophane" when a solution of venom was dialysed against distilled water for 20 hours. The toxicity of the residual venom was reduced by at least four-fifths, whilst the toxicity of the dialysate, which was acid in reaction, was about half that of whole venom. However, when a solution of the freeze-dried dialysate was injected into mice, the toxic effects were indistinguishable from those produced by whole venom.

Electrophoretic Separation of Venom.

Three groups of toxic substances with distinct mobilities could be separated, together with a number of non-toxic components. One of the toxic groups of substances did not contain any amino-acids. The lethal dose of each of

the separate toxic fractions was less than that of whole venom. A report on these separate fractions will be published in more detail elsewhere.

EFFECTS OF PHYSICAL AND CHEMICAL AGENTS ON VENOM.

Effect of Temperature and pH.

The toxicity of an aqueous solution of venom in normal saline remained unaltered after storage at 4°C. for a period of four months. It was unaffected by repeated freezing and thawing. Incubation at 37°C. for two days also did not result in any detectable loss of toxicity. A slight loss of toxicity occurred when a solution of venom, buffered at pH 8.5, was incubated at 37°C. for 24 hours.

When an aqueous solution of venom was boiled, a flocculant precipitate was produced which comprised 12% to 22% of the original amount of venom. The coagulated material, which was insoluble in normal saline solution, produced no toxic effects when a suspension of it was injected into mice or guinea-pigs by the subcutaneous route.

A solution of venom did not lose its toxicity after being heated at 100°C. for one hour. However, although the LD₅₀ of heated venom was not appreciably different from that of unheated venom, it failed to produce the excitatory phenomena which usually precede death when non-heated venom is injected into mice by the intracerebral route (Wiener, 1957). Otherwise heated venom could not be distinguished from non-heated venom by either chemical or immunological tests.

When a solution of venom was autoclaved at 120°C. for 20 minutes, its toxicity was completely destroyed. Similarly, when a solution of venom was heated at 100°C. in the presence of N/10 sodium hydroxide solution, an appreciable loss of toxicity occurred. However, no detectable loss in toxicity occurred when a solution of venom was heated at 100°C. for 20 minutes in the presence of N/10 hydrochloric acid, or after storage for 14 days in an aqueous solution containing 33% acetic acid.

The Effects of Pepsin and Trypsin on Venom.

A solution of venom containing 0.2% hydrochloric acid and 0.1% of pepsin was placed in a water bath at 40°C. for a period of two hours. A control solution of venom containing 0.2% hydrochloric acid, but no pepsin, was heated for a similar period of time. Both solutions were then neutralized, and different amounts of each were injected into mice by the intravenous route. The toxicity of both solutions was the same as that of unheated venom, freshly prepared in normal saline solution.

A similar experiment was then performed with the use of 0.1% trypsin solution and 0.1% sodium carbonate solution, with appropriate controls. After incubation at 40°C. for two hours, the different solutions were tested for toxicity. The venom solution containing trypsin and alkali had lost at least 50% of its original toxicity. The venom solutions containing only trypsin and alkali respectively had not suffered any detectable loss in toxicity.

These results indicate that some of the toxic components of venom are decomposed by trypsin, but not by pepsin. Since pepsin digests proteins to the proteose and peptone stage, it may be inferred that the majority, if not all, the toxic components of venom are not proteins. The dialysability of the toxic components of venom supports this view.

Trypsin decomposes proteoses and peptone to yield polypeptides and amino-acids. However, trypsin also contains esterases which can split ester bonds of organic compounds not containing amino-acids (Laidler, 1954; Neillands and Stumpt, 1958). This and the observation that only 50% of the toxicity of the venom was lost by the action of trypsin provide a basis for the belief that some of toxic components of venom are polypeptides or may even be compounds which do not contain amino-acids. At least one toxic fraction in venom which did not contain an amino-acid could be identified electrophoretically.

The presence of these non-protein, toxic components in venom provides an explanation for our failure to produce an effective antivenene against venom.

The Effects of Various Substances on the Toxic Action of Venom.

Several of the manifestations of intoxication which follow an injection of the venom of *A. robustus* into animals resemble those produced by stimulation of the parasympathetic system. Excessive salivation, pulmonary oedema, dyspnoea, muscle twitching, myosis, vomiting and collapse are some of the manifestations which have been described in human cases as following a bite by *A. robustus* (Beazley, 1930; Ingram and Musgrave, 1933). Similar manifestations follow the injection of neostigmine (Goldstein *et alii*, 1949) and poisoning by parathion, which inactivates cholinesterase (Kanagaratnam *et alii*, 1960).

Tests were carried out with a number of substances which, on the basis of the observed pharmacological effects and properties of venom, might be expected to exert some protective effect.

Atropine Sulphate.

From 0.1 up to 2 mg. of atropine were injected into mice at varying periods of time before and after an injection of one lethal dose of venom. Secretions from the nose and mouth of treated animals were prevented or suppressed. Otherwise the toxic effects of venom were the same, and death occurred within the same period of time as in control animals not injected with atropine.

Cortisone.

Daily subcutaneous injections of 2.5 mg. of cortisone were given to each of 10 mice for a period of three days. Six hours after the third injection, a dose of 0.3 mg. of atropine sulphate was injected into five of these mice by the subcutaneous route. Half an hour later one lethal dose of venom was injected into all the animals by the intravenous route. None of the animals survived. Those mice which had received atropine did not show any nasal secretion prior to death.

Adrenocorticotrophic Hormone.

Three mice which had received 5 units of ACTH were exposed, one hour later, to a bite by a male funnel-web spider. All three animals died within 15 to 30 minutes after the bite.

In another experiment, 5 units of ACTH were injected into mice by the intraperitoneal route. Half an hour later, different doses of venom were injected and the results shown in Table II were obtained.

TABLE II.
The Lethal Effect of Venom in Mice Pretreated with ACTH.

Amount of Venom Injected (mg.).	Mice Receiving 5 Units of ACTH.		Control Mice.	
	Number Injected.	Number that Died.	Number Injected.	Number that Died.
0.38	2	0	3	0
0.42	3	0	3	3
0.46	3	1	3	3
0.52	3	3	2	2

Thus some protection was evident towards slightly more than one lethal dose of venom. Two of the three animals which survived the injection of one and a half lethal doses of venom (0.46 mg.) showed temporary weakness of the hind limbs with closure of the eyes. No protection was demonstrable when ACTH was injected after symptoms of envenomation had started to appear.

Wallace and Sticka (1955) have previously attempted to study the effects of ACTH on venom intoxication. Since these authors could not demonstrate any toxic effects in animals after a bite by *A. robustus*, the attempt had to be abandoned.

D-Lysergic Acid Diethylamide Tartrate ("LSD25").

This substance is an inhibitor of 5-hydroxytryptamine. Mice tolerated an amount of 0.01 mg. of "LSD25" by the intravenous route. This amount of "LSD25" did not prevent death in animals which were subsequently injected with a lethal dose of venom. Death was also not prevented

when atropine, "LSD25" and the serum of an animal immunized with the venom of *A. robustus* were injected before the administration of a lethal dose of venom.

Other Substances.

A number of other substances were tested for their ability to neutralize *in vivo* or *in vitro* the lethal effects of venom in mice.

No protection was obtained when any of the following substances were injected, in sublethal doses, 10 to 30 minutes before the administration of a lethal dose of venom: curare, succinylcholine, neostigmine, adrenaline, noradrenaline, dihydroergotamine tartrate, piperidyl-methylbenzodioxane hydrochloride ("Piperoxane"), heparin, chlorpromazine, pentobarbitone, 2-pyridine aldozime methiodide (PAM), methylene blue, Congo red and potassium chloride.

Animals sedated with pentobarbitone were more susceptible to the toxic effects of venom. Although death was not prevented, the survival times of animals relaxed with mephenesin was prolonged. The combined use of mephenesin, atropine and the serum of an animal hyperimmunized with the venom of *A. robustus* did not protect against the lethal effects of venom. However, animals so treated, even without the use of serum, expired quietly and did not exhibit convulsions or pulmonary oedema, which are the usual distressful features heralding death when a lethal dose of venom is injected.

No neutralization of the toxic effects of venom occurred when sublethal doses of each of the following substances were mixed with venom and then injected, either immediately or after incubation, at 37°C. for half an hour: heparin, tetraethylammonium chloride, cysteine, ascorbic acid, emetine, copper sulphate, zinc sulphate, calcium gluconate.

Iodine or hydrogen peroxide did not destroy the toxicity of venom immediately. However, after incubation at 37°C. for half an hour, the toxicity of the venom was destroyed. At the same time the iodine solution was partially decolorized by venom.

A solution of potassium permanganate inactivated the toxicity of venom immediately it came in contact with a solution of venom. A brown precipitate was produced, and the remaining supernatant fluid was not toxic. When the precipitate was redissolved in a slightly alkaline solution and then injected into a mouse, the animal died in 24 hours. A volume of 0.1 ml. of a 1:1000 solution of potassium permanganate inactivated *in vitro* about 2 mg. of venom.

Red-back spider antivenene, tiger-snake antivenene or canine anti-tick serum did not neutralize the toxic effects of the venom of *A. robustus*.

The hyperimmunization of a horse, sheep, rabbit and guinea-pig resulted in the production of antibodies which precipitated with some of the constituents of native venom. However, even after concentration, these sera failed to neutralize the lethal or any of the toxic effects of venom.

The neutralization of venom by the haemolymph of *A. robustus* has been described previously (Wiener, 1961).

THE ACTION OF VENOM ON TISSUES.

In order to define the possible sites of action of venom in the body, the following studies were undertaken.

Action of Venom on Smooth Muscle.

The venom of *A. robustus* stimulated the uterus and ileum of the guinea-pig. The addition of 0.5 to 0.7 mg. of venom to 75 ml. of oxygenated Tyrode solution, in which the uterine horn of a virgin guinea-pig was suspended, resulted in a maximum contraction. With 0.3 mg. of venom, about one-third of a maximum contraction was produced (Figure II). The onset of contraction occurred within 15 to 20 seconds after the addition of venom, and the maximum contraction for each effective dose of venom was reached two or three minutes afterwards. The uterus then relaxed fairly rapidly.

It did not appear to be adversely affected by venom, since it continued to contract vigorously to several successive additions of venom. Its sensitivity to histamine was also not impaired.

The ability of venom to stimulate the uterus was not diminished by heating venom at 100° C. for twenty minutes.

The addition of 10 µg. of an antihistamine ("Antistine") and 60 µg. of atropine sulphate to the bath prior to the addition of venom did not diminish the contraction of the uterus.

Contraction was also not diminished by the addition of 50 µg. of lysergic acid diethylamide, which is an antagonist to 5-hydroxytryptamine.

Action on Nerve Conduction.

Dr. W. R. Adey, formerly of the Anatomy School, University of Melbourne, has recorded electromyograms

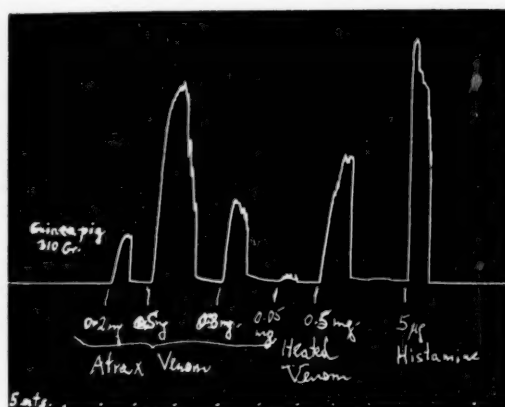


FIGURE II.

The stimulating effect of venom on the uterus of the guinea-pig.

of the gastrocnemius muscle of the rat when venom was applied to the trunk of the sciatic nerve.

Cessation of conduction occurred after the application of 2 mg. of venom to the nerve (Figure III). Complete recovery occurred soon afterwards and appeared to be hastened by the addition of paraffin oil to the part of the nerve which was surrounded by the venom solution.

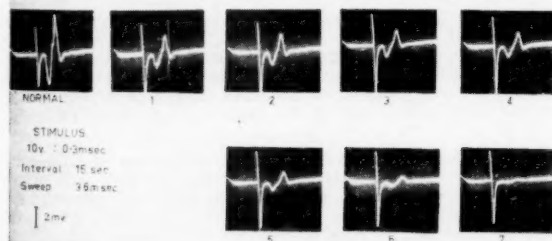


FIGURE III.

Electromyogram of gastrocnemius muscle of rat; 2 mg. of *A. robustus* venom applied to sciatic nerve trunk.

After the local application of a drop of venom solution to the cerebral cortex of a rat, there resulted almost immediately a marked reduction in the amplitude of both fast and slow waves (Figure IV). Spontaneous recovery occurred 15 minutes after the application of venom.

Effect on Epidermal Cells.

After the intradermal injection of venom into the rabbit or guinea-pig, the animals appeared to suffer temporary pain. Otherwise no local reaction was produced.

The intradermal injection of 0.05 mg. of venom in a human subject produced intense pain at the site of injection. Within a few minutes, a pink weal surrounded by erythema appeared, and the skin around the site of injection felt numb. The weal remained circular without the formation of pseudopodia, and there was no itchiness. The pain remained localized at the site of injection and had disappeared 30 minutes after the injection. By this time the weal had faded and become merged with the surrounding erythema, which was spotty in distribution. The hair follicles around the site of injection were erect, producing the appearance of "goose-flesh" and localized sweating was present.

One hour after the injection, the peripheral erythema had faded, and the pale central area was tender on pressure. By evening only the puncture mark of the needle was visible. However, the next day, erythema and oedema appeared at the site of injection and increased for 48 hours afterwards. By this time it had all the features of a positive tuberculin reaction.

Seven days after the injection, slight induration and erythema were still present. No constitutional effects were experienced at any time after the injection of venom.

Effect on Red Blood Cells and Other Cells.

The addition of 1.7 mg. of venom to 0.5 ml. of a 3% suspension of washed erythrocytes of the mouse, guinea-pig and rabbit respectively produced no hemolysis when the mixture was incubated for up to 24 hours at 37° C., even in the presence of lecithin. On several occasions the blood of mice and guinea pigs which had died from the effects of venom was collected and centrifuged. No hemolysis of the supernatant plasma was ever observed.

Mr. J. Thayer, of the Commonwealth Serum Laboratories, has added the venom of *A. robustus* to a suspension of monkey kidney cells which were being grown in tissue culture. No inhibition or interference with the growth of these cells was observed after the addition of 3 mg. of venom.

No inhibition of the growth of staphylococci on agar occurred when venom was allowed to diffuse around the site of inoculation.

Mr. L. Austin, of the Defence Standards Laboratories, Maribyrnong, observed no alteration of the respiratory quotients of brain and liver cells of the rat when these cells were incubated in the presence of venom. There was also no interference with the oxidation of pyruvate by phosphorylase when venom was added to the system.

There was no detectable inhibition *in vitro* of the activity of cholinesterase in the presence of venom, nor was any reduction of cholinesterase activity of the brain and blood of a rat detectable after the animal had been injected with 5 mg. of venom.

DISCUSSION.

The majority of the toxic components of the venom of *A. robustus* are non-protein in nature. Their precise composition has not been elucidated, but they possess the properties of various breakdown products of protein, such as proteoses, peptones and polypeptides. Some of the toxic components do not contain amino-acids, whilst others have the properties of organic acids.

Substances which have a molecular weight of 20,000 or more do not pass through "Cellophane" (Chain and Goldsworthy, 1938; Barnes and Trueta, 1941). On this basis, the majority of the toxic components of venom have a molecular weight of less than 20,000. In view of the lack of antigenicity of the toxic components, it is probable that their molecular weights are considerably lower than 20,000.

Although venom also contains 12% to 22% of heat-coagulable proteins, they did not appear to possess any toxic properties. The toxic components of venom were remarkably stable to the action of heat and in the presence of acid.

It is probable that the localized pain which follows a bite by *A. robustus* and the injection of its venom is due to the low pH of venom.

The toxic effects of venom are produced by several distinct toxic fractions. Since no single toxic fraction, obtained by dialysis or electrophoresis, possessed a toxicity which equalled or was greater than that of whole venom, one may postulate that the toxic effects are due to the synergic action of several toxic components. Micheel and Jung (1936) observed that after dialysis, the venom of a snake (*Agkistrodon piscivorus*) lost 50% of its original toxicity. This could be restored by mixing it with the dialysate, which alone was not toxic. They postulated the presence of a non-toxic activator in the venom of this snake. It is possible that one or more of the components in the venom of *A. robustus* enhances the toxicity of other fractions and also possesses a toxic action of its own.

cases (Ingram and Musgrave, 1933; Irwin, 1952), repeated and larger doses of atropine were given and a venesection was performed. In parathion poisoning, in which the symptoms which occur resemble many of those produced by the venom of *A. robustus*, the administration of atropine (one two-hundredth to one-fiftieth of a grain every 15 minutes for a few hours) was effective in reducing bronchial secretion and in ameliorating dyspnoea (Kanagaratnam *et alii*, 1960).

Pulmonary oedema, which is a common feature of venom intoxication in man, may be due not only to the stimulating effect of venom on secretory cells, but also to a generalized increase in capillary permeability. The intravenous administration of normal saline solutions is therefore of doubtful value and may be contraindicated. In the presence of peripheral circulatory failure, characterized by shock, low blood pressure and a rapid thready pulse, an intravenous infusion of plasma or serum may be

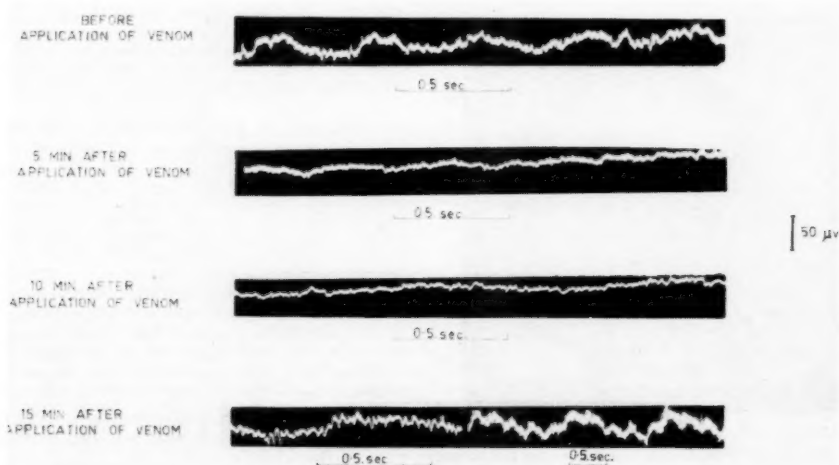


FIGURE IV.

Electroencephalogram from parieto-occipital cortex of rat. *A. robustus* venom applied topically to cortex.

The small molecular size of the toxic components of venom provides an explanation for the rapid onset and progression of symptoms which follow a fatal spider bite in man and animals. To be effective, a tourniquet must therefore be applied immediately after a bite, and this should be followed by complete immobilization of the bitten limb in order to delay absorption by both the capillaries and lymphatics.

Of all the substances which were tested for their ability to neutralize the toxic effects of venom, only atropine, ACTH and mephenesin deserve further study.

Pre-treatment with ACTH resulted in protection against one, but not against more than one and a half, lethal doses of venom. Even this feeble protection could not be obtained when ACTH was injected after the administration of venom. For this reason, the value of ACTH as a therapeutic measure must remain in doubt. In one human case which ended fatally, ACTH was used about three hours after the bite.

Neither atropine nor mephenesin prevented death, although by their combined use the survival time of mice was prolonged and the occurrence of some of the manifestations of envenomation was prevented. Atropine was effective in drying up secretions in animals after the injection of venom. In five of the 10 fatal human cases (Table I), atropine in the usual dosage of one one-hundredth of a grain was given. In two severe non-fatal

preferable. However, the successful employment of venesection in two severe cases of intoxication indicates the therapeutic dilemma which confronts the physician.

The rapidity with which the toxicity of venom is destroyed by potassium permanganate should be utilized, whenever possible, in the first-aid treatment of human patients. The injection of 0.1 to 0.2 ml. of a 5% solution of potassium permanganate into each puncture wound can be expected to inactivate any venom which is still present at the site of the bite. Such treatment has been used successfully in the case of stings by venomous fishes, and no necrosis of the skin was produced (Wiener, 1958).

None of the observed effects of venom on tissues and cells provide a satisfactory explanation for the lethal effects of venom. Relatively large doses of venom had to be used before any effects were produced on smooth muscle and nerve conduction. In both cases the effects were temporary.

The absence of a prolonged latent period before contraction of the uterus occurred suggests that the substance or substances which stimulated contraction had a direct action on smooth muscle. The administration of acetylcholine, of histamine or of 5-hydroxytryptamine is not responsible for the stimulating effect. The presence of these substances is also excluded from the reactions observed when venom was injected into the skin. It is probable that peptones or other protein-cleavage products

contributed to, or were alone entirely responsible for, the stimulating effect of venom on smooth muscle. The presence of these substances is suggested from the observed effects of trypsin on venom. The stimulating effect of venom on smooth muscle may contribute to the dyspnoea which occurs even in the absence of pulmonary oedema.

Since the dose of venom required to abolish nerve conduction was considerably higher than the amount of venom necessary to kill the animal by injection, it is uncertain to what extent interference with peripheral nerve conduction contributes to the lethal effects of venom. It is possible, however, that when venom is circulating in the blood, it is carried to susceptible receptor sites more readily than when it is applied to the external surface of a nerve.

The changes in the electroencephalogram, which were obtained with a smaller dose of venom than was necessary to inhibit peripheral conduction, indicate that venom also disturbs the function of the central nervous system. It has been shown previously that when venom is injected into the brain of mice, its toxicity is 100 times greater than after subcutaneous administration (Wiener, 1957).

SUMMARY.

The toxic components of the venom of *A. robustus* were heat-stable, dialysable and non-antigenic. Their toxicity was not destroyed by the action of acid or pepsin.

When venom was heated in the presence of N/10 sodium hydroxide solution, its toxicity was reduced. Trypsin also reduced the toxicity of venom.

A number of substances were tested for their ability to neutralize the toxic effects of venom. Atropine abolished the secretory effects and mephenesin the muscular spasms. Neither substance, alone or in combination, prevented death. ACTH exerted a weak protective effect if administered before, but not after, the injection of venom.

The toxicity of the venom was destroyed by potassium permanganate at room temperature, and by iodine or hydrogen peroxide after incubation at 37° C.

The venom exerted a stimulating effect on smooth muscle, abolished peripheral nerve conduction and disturbed the electrical activity of the cerebral cortex of the rat. All these effects were temporary, and normal function returned spontaneously.

The significance of these findings in relation to the lethal effects of venom and to the treatment of human cases of intoxication is discussed.

ACKNOWLEDGEMENTS.

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THE TIME FACTOR IN SURGERY.¹

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At the beginning of this century the pupils of Halsted (Carter, 1952) and Kocher were developing the cult of slow surgery as a swing from the techniques of the preanæsthetic era. Since then, partly because of the increased safety of anaesthetics and the greatly improved methods of resuscitation, there has been a tendency in some quarters to prolong operations even more. One can almost hear these surgeons saying that the longer the operation takes the better it will be done. This might apply to cabinet-making and other trades; but, in general, it does not apply to surgery.

Such slowness as a virtue was criticized by Bowers last year, who wrote that "improvements in anaesthesia have made operating by the calendar instead of by the clock the accepted procedure", and in the same year the editor of *The Lancet* considered this facet of surgery worthy of an editorial.

Previously, Ogilvie in 1950 had stated that the deleterious effects of an operation increase by geometric progression as the hours slip by. This could mean, for example, that the effect on a patient at the end of four hours would be doubled if the operation is prolonged for another hour; and it is in keeping with Hewer's statement (1943) that "the ill effects of an anaesthetic and operation rapidly increase after a certain length of time".

On the other hand, it has recently been suggested that the depressant effects of an anaesthetic are all wholly reversible if anoxia and continued deep anaesthesia are avoided and if the blood volume is maintained. Dr. Fisk will discuss this possibility, from which, if it is true, it follows that any disadvantage of a prolonged anaesthetic must be due to lack of watchfulness on the part of the anaesthetist and his fallibility because of fatigue rather than because of permanent general ill effects from the anaesthetic itself.

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on June 29, 1961. The report of this meeting will appear in a subsequent issue of the Journal.

However, for the moment let us consider Ogilvie's suggestion and represent it graphically. In Figure I the time of a hypothetical operation is plotted against the general ill effects on the patient, and this gives the continuous parabolic line. In a similar manner the degree of surgical benefits to be derived as the operation proceeds may also be represented graphically, and in Figure II the interrupted line shows the relationship from hour to hour of the surgical benefits after the same hypothetical operation.

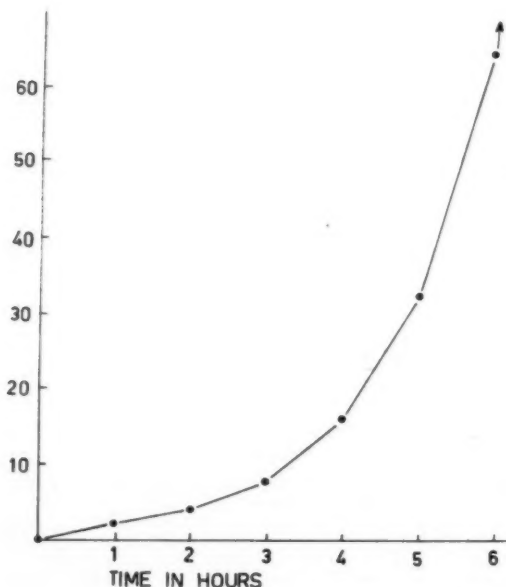


FIGURE I.

It will be noticed here that it is assumed there is a minimum time within which it is not possible to complete the operation with benefit to the patient, and in this hypothetical case this minimum time is taken as one hour.

Apart from that, in certain cases the giving of an anaesthetic with the resuscitation that accompanies it and the relief of preexisting anoxia may, in itself, result in improvement in the general condition of the patient rather than in any deterioration. This possibility is not covered by Ogilvie's statement.

It will also be noted in Figure II that there is an optimum time after which there is a falling off in the surgical benefits. There are many reasons for this; for instance, prolonged exposure of the wound is more likely to lead to infection, atelectasis and pneumonia are more frequent, the wound edges become damaged because of prolonged retraction, and fatigue of the surgeon and of the theatre staff lessens their efficiency. The close relationship between fatigue and inefficiency is often overlooked.

In this regard it is of interest that the fatigue is due to sustained mental effort and to remaining in the same position so long, and it is not often due to physical work. By direct calorimetry Levey *et alii* (1959) found that with most operations more energy per minute is expended whilst scrubbing the hands than during the operative procedure.

Other surgical reasons for avoiding prolonged operations are: (i) stasis occurs in the veins of the calves if they are compressed against the table; (ii) prolonged handling of the tissues leads to special changes (for example, paralytic ileus following prolonged handling of the bowel); (iii) the blood loss is more likely to be under-estimated as the hours pass; (iv) there comes a time beyond

which the fiddling of the surgeon can do more harm than good.

Although the type of operation is not specified in the foregoing discussion, it will be seen that it could apply to such procedures as total colectomy and ileostomy, arterial grafting, the construction of an ileal bladder, Wertheim's operation and so on.

In Figure III the hourly relationship between the general ill effects (the continuous line) and the surgical benefits (the interrupted line) may be compared, and it will be seen that beyond a certain time (three hours in this case) the general ill effects more and more exceed the surgical benefits, which are in fact themselves decreasing from then on. In other words, there is an optimum period for the performance of the operation. This optimum period varies from case to case.

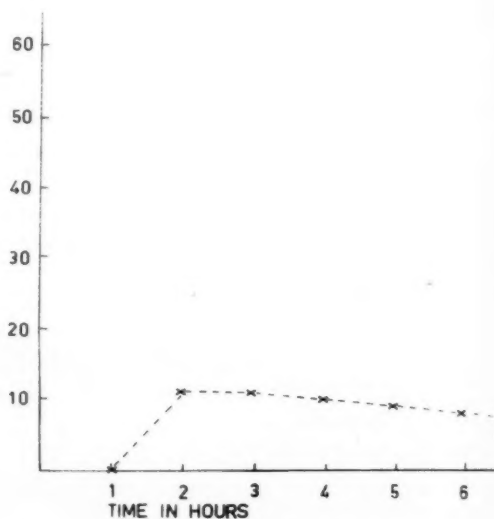


FIGURE II.

In this discussion various assumptions have been made for the purposes of clarity, and the conclusions drawn from them are intended only as generalizations.

As an example of the former dangers of prolonged operations Organe's statement (1943) that "few thyroidectomies will survive an operation of more than three hours" may be quoted. This should no longer apply, for Organe was referring to operations performed for thyrotoxicosis on patients who had not had the benefit of present-day antithyroid drugs; but, even so, this statement emphasizes the dangers of a prolonged operation if it has not been possible to render the patient euthyroid.

At the same meeting of the Royal Society of Medicine, Gillies (1943) stated that the anaesthetist can less and less avoid an increased occurrence of post-operative chest complications the more the operation and the anaesthetic are prolonged. He especially drew attention to the fact that unobserved anoxia of even a minor degree becomes of greater and greater importance when the operation is prolonged; and this is certainly still true. The same may be said of unrecognized heat and fluid loss.

On the other hand, methods of resuscitation are more efficient than when Nosworthy (1935) wrote that the length of time a shock-producing factor is in action is of extreme importance, no matter how efficient the anaesthetist and resuscitator may be.

Similarly, Kaye (1937) was writing before the days of hypotensive anaesthesia when he stated that: "It is now generally held that a patient must not be left for more than twenty minutes with a systolic pressure below 80 mm.

Hg or a diastolic pressure of less than 60 mm. Hg. If this is appreciably exceeded, death is extremely probable within forty-eight hours." Even so, uncontrolled hypotension is just as fatal as it was then and Kaye's figures are worth remembering.

As the anaesthetic problems of prolonged operations are being covered by Dr. Fisk, further discussion of them will be left to him and the rest of my remarks will be confined to more direct surgical problems.

Time and motion studies in industry and in the operating theatre were first investigated on a scientific basis by Frank Gilbreth (1916), whose motto was "No haste, no waste". Gilbreth will also be remembered as having a leading part in his children's book "Cheaper by the Dozen".

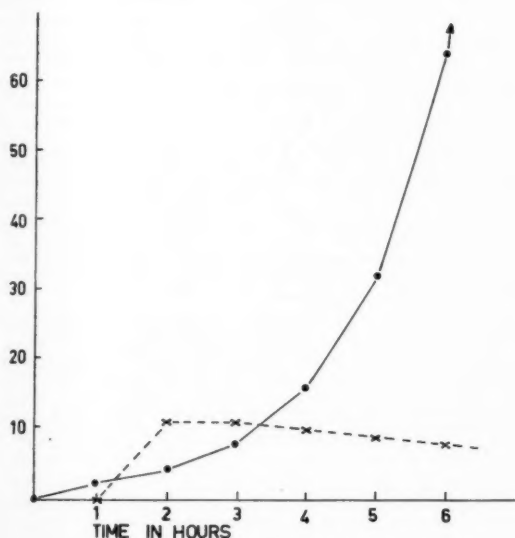


FIGURE III.

In the years since Gilbreth first discussed time and motion studies a few papers have appeared which have elaborated his work in the operation theatre (Markus, 1952; McKenna, 1957; Ogilvie, 1938), but this subject has been largely ignored by surgeons.

Briefly, the science of time and motion studies deals with the search for the best way of performing each action. It is concerned not with the choice of procedure in an individual case, but rather with a critical review of the methods of performing the chosen procedure. The science of time and motion studies does not advocate haste and short cuts, but it attempts to eliminate delays and those movements which contribute nothing to the progress of the operation or to the welfare of the patient.

One method of eliminating delays during an operation is by pre-operative planning, and the importance of this should be apparent. Much time may be saved by adequate pre-operative preparation and organization.

It is the duty of the ward staff to have the patient ready to leave for the theatre when notified—that is, there should be no last-minute shaving, giving of enemas or other procedures whilst the theatre staff is waiting. At the same time, the ward staff should be informed well in advance of any change in the theatre timetable.

Often time is wasted between operations because of the trolley men. One of the best means of overcoming this problem is to abolish them and to increase the number of resident medical officers attached to each surgical team. The residents then take it in turn to act as the trolley

men. In this way the patient is accompanied by a doctor to and from the theatre; there should be less delay, the residents are more responsible to the surgeon than are the trolley men, and there may even be a saving in wages. I have seen this in action in some American hospitals, where it works quite satisfactorily.

Time may also be saved between operations by the use of two theatres and theatre staffs, two anaesthetic teams and two sets of assistants, but that is not always possible and the disadvantage to some patients of having another team carry out the preliminary or final portions of the operation is obvious if the relieving team is less experienced. However, the opposite may apply, when an important stage is reached at the end of a long operation—for example, the construction of the anastomosis after a prolonged dissection during an oesophago-gastrectomy—and then it may be advantageous to have another surgeon who is not fatigued take over (McNeer and Pack, 1954).

Occasionally surgeons have been known to take a rest during prolonged neurosurgical and other procedures, and this has much to recommend it. At the same time the patient also gets a rest and his circulatory system may get a chance to catch up.

In the operating theatre pre-operative planning which will avoid loss of time during the operation is concerned with the placement and type of the theatre furniture, the placement of the staff, the training of the surgical team to work together, the checking of equipment such as the sucker and the diathermy, the availability of duplicate equipment, the standardization of instruments—which should be kept as simple and as few in number as possible so that the surgeon and his assistants will be more familiar with their use—the availability of rapid sterilization and the arrangement of the instruments in a constant manner and within easy reach of both the surgeon and the instrument sister.

According to Lawrence and Berry (1938; 1939), having the sponges and instruments within easy reach of the surgeon and of the instrument sister means that they do not have to reach any further than they would at a dinner table. This is most easily obtained by the use of instrument and sponge tables which are curved and which are provided with foot pumps to raise or lower them.

Furthermore, the theatre furniture and staff should be so arranged that the instrument and sponge table are in front of, and not at the side or back of, the sisters or nurses. The back of any assistant, sister or nurse should never be towards the patient or the surgeon, nor should it be necessary for the surgeon to turn his back on the operating table to reach his wash bowl. Apart from the saving of time there is then less chance of a break in asepsis. Time will also be saved and not wasted if the scout nurse stays in the theatre for the duration of the operation.

Pre-operative planning also includes the keeping in the theatre and having readily available all drugs, instruments, equipment and transfusion and infusion apparatus which could possibly be required during the operation or during any emergency (and this especially includes the equipment and drugs for cardiac massage and for tracheostomy), no matter how small the operation.

Time may also be saved if blood has been cross-matched whenever there is any chance, however slight, that transfusion will be required during the operation.

When large numbers of interrupted non-absorbable sutures are to be used it saves much time during the operation if these sutures are all threaded, fixed to a towel and sterilized in advance. This device is often used by neurosurgeons, oto-rhino-laryngologists and other specialists, but such special preparation is rarely afforded the general surgeon.

Pre-operative planning also includes the instruction of nurses and orderlies in the use of theatre lights, the sucker, the diathermy apparatus and the blinds or

shutters. In addition, it includes instruction in the method of adjusting the table, the situation of emergency supplies and equipment, and the situation of reserve supplies of drapes, pads, sponges, gauzes, gloves, needles and suture materials. Without such instruction much time will be lost, and, on occasions, such loss may be fatal.

Finally, before scrubbing up, the surgeon should personally check the posture of the patient, the position of the light and the availability of special instruments.

Most pre-operative planning refers to preparations which may be made long before the operation starts, but nevertheless such preparations and forethought greatly affect the duration of the operation.

This also applies to preplanning by the anaesthetist. It is just as important that the anaesthetist does not waste time before or after the anaesthetic has started as that the surgeon does not.

In addition to saving time by pre-operative and pre-anaesthetic planning we are also concerned here with speed without haste during the operation. This does not mean that all care should not be taken, nor does it mean that the anaesthetist and theatre staff should be hustled. Bustling is especially to be avoided, for it is apt to cause inefficiency, and it is important to preserve a happy atmosphere in the theatre if there is to be no waste of time.

It should be the aim of the surgeon to see how carefully he can do the operation without wasting time rather than how quickly. A few minutes saved during an operation are rarely worth while if, as a result, some complication ensues. The criteria of a successful operation include the recovery of the patient with the minimum of post-operative symptoms and without complications.

Speed should not be used to impress. Perhaps you have not heard of the surgeon who used to leave his car running outside the hospital when he was doing an appendicectomy, saying that it was not worth while turning the engine off for a few minutes. He certainly impressed his patients and their friends, but the saving of time was accomplished by such manoeuvres as using a single ligature for the appendix and mesoappendix and cutting them off boldly with a single sweep of the scissors. The caecum was then dropped back into the abdomen without further ado. One or two sutures through all layers finished the operation.

By leaving out steps of an operation, by being satisfied with incomplete haemostasis, by tying off large masses of tissue *en bloc*, by always using continuous sutures or by using only a few interrupted sutures we could all cut our operating times. On the other hand, by more careful planning, by the avoidance of unnecessary movements and by more practice with the use of our instruments time could also be saved by all of us.

Tying off large masses of tissue does not save time if haemostasis is incomplete, and there is the further objection that other important structures may be inadvertently included in such a ligature. Apart from these objections mass ligation will, of course, lead to large sloughs and these may lead to other troubles later on.

It is of interest that in 1916 Gilbreth wrote: "Industry has nothing to learn from the skill of the surgeon, but the surgeon has much to learn from the skill of other artisans". This still applies.

Even though a plea for standardization was made as long ago as 1914 (Dickinson), we still have no accepted standard for the technical points of surgery. For instance, even the type of incision used for similar cases varies widely from surgeon to surgeon because of personal likes and dislikes or because of the traditions of his training school and teachers. Accordingly, there is no standardization in surgical teaching or in the performance of operations. This is unfortunate, but it is in keeping with the fact that the performance of surgery is not restricted to those with special training or special study.

It is to be stressed that time is frequently wasted owing to inexperience. For example, during certain operations,

such as the perineal dissection of the rectum, much time may be wasted in the early stages in dealing with small bleeders which will later be removed.

According to Gillies (1943) great prolongation of the time of an operation is often due to specialization before an adequate surgical training has been acquired. Ideally, each surgeon should have a wide training, so that his own technique is chosen from the various techniques of his many teachers. In this way procedures which waste time should be avoided. As far as possible, the training of surgeons should also include experimental work on animals, for this teaches speed with gentleness.

If the surgeon is adequately trained, he will be able to perform any procedure which unexpectedly becomes necessary once the operation has started, and there will be no loss of time owing to uncertainty on his part or to his having to send for help. In addition, he must be able to hurry in an emergency, for speed is sometimes a factor in safety, and in extreme emergencies even the speed of the preanaesthetic era may be required.

Speed during an operation does not mean fast movements. Rather, it means the avoidance of unnecessary movements, dexterity—both inborn and the result of training and practice—the use of both hands, the use of continuous sutures whenever they are not contraindicated, the use of an incision of the optimum length for the individual case and the pre-operative planning, organization and preparation as already mentioned. A saving of time may also result from the use by the surgeon of a few hand signals. Many such signals were proposed by Pool and Bancroft (1917), but it is rare for more than a few to be used.

Fast movements have definite disadvantages. Firstly, if the suture material is pulled rapidly through the tissue, some of the tissue surrounding the suture hole will be burnt; secondly, bleeding may be less if slower movements and more care are used; thirdly, the suture material may be pulled too tight if the movements are fast; and fourthly, more tissue may be ligated or divided than is intended.

A few surgeons—for example, W. B. Gabriel of London—have their operations standardized so that they almost appear to proceed by numbers. This is unusual and comes only from long practice. However, it does result in a saving of time. Incidentally, apart from operations a lack of standardization also applies to the use of drugs—for example, penicillin is usually ordered in doses many times larger than that which will produce the maximum effect.

Transfusion should not be delayed during an operation "to see if we can manage without it", a statement which a few anaesthetists have been known to make. Such a delay in giving a transfusion when it is first indicated may result in a delay later in the operation whilst the patient is being resuscitated. The need for such resuscitation should be anticipated.

The time factor becomes important in patients who are poor surgical risks because of debility, degenerative changes or age (Shields, 1960)—both the senile and the neonatal patients being very vulnerable in prolonged operations.

The decision to embark on a prolonged operation, or even the decision to operate at all, should rest more with the anaesthetist than with a physician. Perhaps we may digress again to say that in a poor-risk case the physician should not write: "This patient is not fit for any anaesthetic." Instead, it is the physician's duty to do his utmost to reduce this risk to a minimum. In the past one has encountered such absurdities as a frail, senile patient with a condition such as an irreducible inguinal hernia being refused operation by the physician; later, when strangulation made operation imperative, the patient was presented to the surgeon.

In general, operative procedures on a poor-risk patient should be kept to a minimum or, if possible, they should be carried out in stages. For instance, the old two-stage

Lockhart-Mummery procedure is very useful in the treatment of a low carcinoma of the rectum in a poor-risk case, for it may be performed in two short stages.

There are various scientific ways of estimating the effect of a long operation on a patient, but if on the following day the patient is really happy, is interestedly reading the paper, is asking for more to eat, wishes to smoke and has had a shave or applied make-up, all must be going well. On the contrary, if the patient is exhausted by a prolonged operation the weakness and tiredness will persist for some days, and the likelihood that complications will develop is greater.

Finally, it may be repeated that for any patient the ideal operation is one which produces the intended result with the minimum post-operative symptoms and without complications. Speed in surgery is important only in so far as it helps to produce this result.

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THE TIME FACTOR IN SURGERY.¹

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THE time factor in surgery may be considered, from an anesthetist's viewpoint, in many different ways, but I shall confine my attention to the problem of the time that may be spent on any one operation, and the possible deleterious effects upon the patient of prolonging that operation. Few would dispute that any surgical operation involves some degree of physiological, as well as anatomical, assault; and it is reasonable to suppose that the longer the assault lasts, the more harm is done to the patient, increasing in at least an arithmetical if not a geometrical sequence. On the other side of the balance are the benefits to be obtained from more extensive, more

meticulous and perhaps less traumatic surgery. It is not within my province to comment on these; neither shall I consider the local effects upon the tissues of prolonged exposure and retraction.

There remain many factors which, during the course of a long operation, may disturb the well-being of a patient, and I have summarized some of them (Table I).

TABLE I.

Temporary.	Treatable.	Pathological.
Anaesthesia: Pharmacological depression of functions. Effects of altered pulmonary ventilation. Position and immobilization.	Fluid loss: Blood, plasma, water and electrolytes. Bleeding (overt and into tissues). Evaporation (from wound lungs and skin). Traumatic oedema. Heat exchanges.	Severe infection. Late effects of shock. Extensive necrosis: Burns and gangrene. Other disease: Cardio-vascular, respiratory and metabolic.

In the first group are conditions which terminate or are reversed at the end of the operation. I have called this the "temporary" group. The second contains factors which may be mitigated and largely counteracted by restorative measures which enable the body's homeostatic processes to operate despite depression by anaesthesia. Although some of these measures themselves, such as massive transfusion and the administration of autoclaved dextrose solutions, bring their own problems by disturbing other homeostatic mechanisms, this is still essentially the "treatable" group. The third or "pathological" group consists of factors which exist prior to the operation, and which may cause anxiety and rapid deterioration as the time of operation increases, but should play little part in most elective surgery.

Estimation of Effects.

Before the discussion of some of these conditions in more detail, it would be wise to consider how their effects may be measured or estimated.

Mortality and Morbidity.

Mortality and morbidity would be the most significant considerations in evaluating the effects of long operations, but it is very difficult to separate the time factor from others. McNeer and Pack (1954), reviewing the results of extended total gastrectomy at the Memorial Center, New York, noted an over-all increase in mortality of 25% in their cases when the operation lasted more than six hours. They suggest fatigue of the surgeon as an important factor, and point out that other factors, such as the greater time required in the resection of more advanced lesions, make their figures suggestive rather than statistically significant.

Metabolic Response to Injury.

The characteristic effect of trauma on the metabolism of patients is well documented (Moore, 1959). There is an increase in adrenal glucocorticoid secretion, and probably an increased sensitivity to the effects of aldosterone. Studies of nitrogen and electrolyte balance, and of blood and urinary corticosteroid levels, throw some light on the effects of different stresses. Moore (1959) states that "undue prolongation of open anesthetised dissection unquestionably adds to the total trauma". However, the extent of the increase in trauma is still not defined.

Moreover, Flear and Clark (1955), in a careful study of the changes following major injuries in 16 patients, found that the typical metabolic response did not occur when blood transfusion was adequate. Their index of adequate replacement was a red-cell volume, a few days after transfusion, comparable to that existing some weeks later.

Serum Transaminase Activity.

Significant alterations in serum glutamic oxaloacetic and serum glutamic pyruvic transaminase levels occur in cardiac, hepatic and muscular diseases (Wroblewski, 1959),

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on June 29, 1961. The report of this meeting will appear in a subsequent issue of the Journal.

and increases follow surgical trauma. Nickell and Allbritten (1957) found really significant increases only after thoracic, cardio-vascular or biliary tract operations and in severe traumatic injuries. They were unable to relate their results to blood transfusion or types of anaesthesia. Wendel (1961) found significant changes in SGOT levels in dogs after induced hypothermia, but only after the hypothermia had been maintained for 12 hours.

Clinical State.

Successful long operations are common, and this in itself is worth remembering. It is again difficult to sort out the effects of different factors, and the criteria may be too crude to detect minor but important changes.

Other Tests of Function.

Measurements of blood flow through different organs and biochemical function tests show alterations and depressions of function during anaesthesia and operation, but these are usually reversible, and do not appear to be closely related to the time factor.

To assess the importance of the time factor in operative surgery is thus a difficult task, and to do so clearly and objectively seems almost impossible. The factors summarized in the table may now be discussed in more detail in the light of these considerations.

Temporary Factors.

Anaesthesia.

The agents used in anaesthesia, whether general, local or regional, all depress the body's functions. General anaesthesia is the most important to consider, as it is almost certain to be used in prolonged operations. General anaesthesia depresses the cardio-vascular system, and this results in reduced contractile force of the heart, local interference with the fine circulation in the tissues, depression of the barostatic reflexes and neurogenic splanchnic vasoconstriction (especially with ether and cyclopropane), with reduction in renal and hepatic perfusion (Price, 1960).

Interference with cell metabolism may cause some metabolic acidosis, and there may be a respiratory acidosis or alkalosis (Robertson and Frazer, 1958). There is a temporary impairment of liver function. All these effects are minimized by the use of modern light anaesthesia, are fully reversible and do not appear to increase disproportionately as time passes. Robinson and Gray (1961) recommend using the effects of respiratory alkalosis produced by hyperventilation to depress central nervous activity during light anaesthesia, but this is also reversible, and there is no evidence of a long-term deleterious effect.

Hammond *et alii* (1958) have studied the effect of anaesthetic agents on the adrenocortical and metabolic response to stress. Thiopentone, nitrous oxide and curare anaesthesia, without surgery, caused no significant changes in the blood and urinary 17-hydroxy-corticosteroid levels or in sodium, potassium or nitrogen balance. Ether and cyclopropane anaesthesia was followed by marked and persistent increases in blood and urinary 17-hydroxy-corticosteroid levels, and changes in sodium balance comparable to those caused by ACTH in a fasting subject. Light ether anaesthesia (upper stage III) produced the characteristic response only if maintained for at least one hour, but deep anaesthesia produced it after only 15 minutes. No changes were detected in the potassium or nitrogen balance. These effects of ether and cyclopropane seem to be related to their property of directly stimulating the sympathetic nervous system, causing release of adrenaline (Robertson and Frazer, 1958). Halothane, on the other hand, may depress sympathetic activity (Price, 1960).

It has been suggested that the incidence of pulmonary complications increases with the length of the operation, but once more, it is difficult to evaluate the significance of these suggestions (Wylie and Churchill-Davidson, 1960).

Posture and Immobility.

During prolonged operations, an important factor must be the effect of lying in the same position for many

hours. Venous and capillary pressure will increase in dependent parts, and this may be of particular importance in the Trendelenburg position, in which the cerebral circulation is affected. The weight of the body must be supported, whatever the position, and the pressure on the supporting part will compromise the local circulation, particularly over a long period, and if there is associated vasoconstriction, or some other condition reducing cardio-vascular efficiency. More important still, venous stasis due to venous obstruction, and venous pooling resulting from anaesthetic techniques, will predispose to venous thrombosis, with the danger of post-operative pulmonary embolism. Prolonged operations are said to increase the likelihood of venous thrombosis (Wylie and Churchill-Davidson, 1960), but we do not know to what extent, or by which mechanism. The metabolic changes which occur after operation include a disturbance of the balance between factors controlling thrombosis and fibrinolysis, and this is thought to be a very important factor in post-operative venous thrombosis. As we have already seen, it is not clear just how the post-operative metabolic disturbance is related to the length of the operation.

Treatable Factors.

Fluid Loss.

As understanding of the physiological stresses of surgery increases, we come to realize that loss of fluid of all kinds is much greater than would appear from superficial observation. This has been shown particularly with regard to the loss of whole blood. Grant and Reeve (1951) studied changes in blood volume after wartime injuries, and began a revolution in the understanding of blood loss in trauma, but recent studies by T. S. Reeve (1961) have shown that undetected blood loss is of even greater importance. Reference to the summary of factors will show how these losses of fluid occur. In a very long operation, losses by evaporation and transudation can be significant, and Stranahan *et alii* (1955), describing a successful resection of the aortic arch lasting 11 hours, mention severe dehydration immediately after operation as a problem. Inhalation of dry gases from non-rebreathing anaesthetic circuits does not involve significant loss of body water, as measurements have shown these amounts to be less than 13 grammes per hour (Chase, Kilmore and Trotta, 1961). However, drying of the respiratory mucosa tends to occur in these circumstances.

Although there is room for improvement in the detection and management of these fluid losses, we are in a position to prevent most of the ill effects they cause during a long operation.

Heat Exchanges.

Hyperthermia during operation may occur in febrile patients, and steps may be necessary to cool such a patient. In afebrile patients, Clark, Orkin and Rovenstine (1954) showed that heat retention is uncommon when the wet-bulb temperature is less than 75° F. This condition should not be difficult to ensure by means of air-conditioned operating theatres. Incidental hypothermia may occur in long operations, particularly when halothane anaesthesia is used in cool surroundings, but this is readily reversed or may be prevented, and does not seem to be unduly dangerous in adults, although there may be some alteration in sensitivity to muscle relaxants (Bigland *et alii*, 1958).

However, in infants accidental cooling can cause respiratory difficulties, and neonates in particular are subject to severe heat loss during anaesthesia and operation (Hercus, 1960).

The Pathological Factors.

In the third column of the table are the factors which may be present before operation, although adequate pre-operative preparation and timing may reduce their effect. Very ill patients in this category are not good risks for surgery at all, and are even worse risks for long operations.

Conclusion.

As advances have been made in surgery and anaesthesia, the time during which a patient may be safely subjected

to an operation has increased. This has resulted in improvement in technique, and in an extension in the scope of, and indications for, surgery. At the same time greater understanding of applied physiology and pharmacology has been achieved, so that the time factor has been extended further. These different steps are interdependent, although they have not always been successfully coordinated.

The opinion has been expressed that, on the other side of the picture, a dilatory approach to surgery has developed which is detrimental to the patient's well-being. Ogilvie (1950) made the statement that the "most significant and dangerous, and the most easily avoided form of trauma is time". Learmonth (1957) said: "The time a surgeon regularly takes over an operation should be only a little slower than the fastest time in which he could operate with safety."

At present, the great majority of prolonged operations last less than four hours, and few last more than five or six. Procedures lasting up to 15 hours have been described (Stranahan *et alii*, 1955). While it is indefensible to prolong an operation without indication, it would appear that in a relatively fit patient who has had adequate preparation, the time factor, from the physiological point of view, is not the most important consideration in planning an operation. On the other hand, patients who are very ill or elderly are not suitable subjects for long operations, although I have had personal experience of a man in his seventies who made an eventual, if not uneventful, recovery from a craniotomy lasting about 11 hours. Neonatal patients do not tolerate long operations well, but our understanding and application of the principles of neonatal physiology lag a long way behind those of adult physiology.

What principles, then, should we enumerate that may guide us when a prolonged operation is being considered?

First, the time available should be used efficiently, with the avoidance of unnecessary delays, especially those due to poor preparation of equipment; as far as possible the element of fatigue in surgeon and anaesthetist must be reduced.

Second, painstaking attention should be paid to the conditions necessary to maintain homeostasis, such as the replacement of blood and fluid loss, and avoidance of heat loss in the neonate.

A common-sense approach should be used to the question of posture, in order to reduce possible deleterious effects. Perhaps we may consider in the future methods of altering, if not the position, at least the weight-bearing areas during a lengthy operation.

Deep anaesthesia for long periods should be avoided, especially with agents such as ether and cyclopropane. Anaesthetic systems should be arranged so that the patient does not have to breathe against increased resistance, and, of course, hypoxia and hypercarbia must be avoided at all costs. The effects of prolonged inhalation of dry gases on the tracheobronchial mucosa should be considered, and there may be a place for artificial humidification of these in long operations. Certainly, when there is any likelihood of mucus, or other inspissated material, in the large bronchi at the end of operation, removal of this by suction under direct vision through a bronchoscope is an efficient, simple and rapid manoeuvre which could be used more frequently.

Lastly, planning for shorter procedures, or staged operations, should be considered in the case of the very ill, or at the extremes of age.

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AN APPRECIATION OF "CHEST PAIN" IN THE ABSENCE OF OVERT CORONARY INSUFFICIENCY; WITH SPECIAL REFERENCE TO CONGENITAL HEART DISEASE.

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A VARIETY of conditions besides coronary sclerosis are associated with chest pain of an anginal type. Thus Wood (1954) has stated that 12% of a series of patients with mitral stenosis had this symptom. Patients with cor pulmonale may also be so afflicted (Talso, 1957).

In the paediatric age group this symptom may be present in congenital heart disease. It occurs in the tetralogy of Fallot, pulmonary stenosis—whether isolated, or associated with a septal defect but a normal aortic root (Stuckey, 1955)—and in certain left-to-right shunts. It has also been reported in congenital aortic stenosis (Marquis and Logan, 1955).

Clinical Features in Congenital Heart Disease.

Frequency.

No exact figures can be given as to the overall frequency of chest pain, because of the youth of many patients and the consequent difficulty of assessing the symptom. However, it appears in definite form in about 30% of patients with tetralogy of Fallot who are able accurately to describe this symptom; this fraction unfortunately is only a moderate proportion of the total number of patients, since many require surgery before this complaint is a feature.

About 20% of patients with left-to-right shunts and elevation of right ventricular pressure (greater than 40 mm.

of mercury) will so complain, and the incidence is greater in those with reversed shunts. However, it is not very common in young patients with pure pulmonary stenosis; if this lesion is combined with a septal defect and right-to-left shunt, but normal aortic root, the incidence is as high as in tetralogy. It has occurred in four of five patients with transposition of the major vessels, who survived to an age of three years or more; however, it did not occur in two cases of Bing-Taussig syndrome. The writer has reviewed only 10 cases of congenital aortic stenosis; the oldest patient was aged twelve years; none had anginal pain. Perhaps, as previously implied (Marquis and Logan, 1955), the symptom occurs in an older age group than the one studied; of five patients with fibro-elastosis surviving to three years or more of age, only one had such pain. Each has had cardiac catheterization and had marked right ventricular and pulmonary hypertension.

Description.

In the paediatric patients studied, this pain was not always associated with exertion. It will come on at rest in bed, or while sitting quietly in a car; retrosternal in site, it does not appear to radiate, and the "angor animi" of the classic anginal attack is not a feature. The duration of the pain is seldom more than two minutes, and is often assessed by parents at about 30 seconds. In the few children in whom the writer was able to obtain electrocardiograms during the paroxysm, no change was visible in the tracings.

Younger children (less than three years of age) will point to the epigastrium as the site of pain; the minimal sense of localization at this stage is notorious (Ellis, 1950). These same children, when older, will localize the pain to the retrosternal area. It is not found in simple left-to-right shunts (for example, in patent ductus arteriosus or ventricular septal defect) or in adult-type aortic coarctation where only the left ventricular work index is raised.

In cases of babies with Fallot's tetralogy many experienced mothers are convinced that their infants have pain. This is evidenced by their crying for "no obvious reason", and it is frequently nocturnal—occurring as a type of "sleep-start". This phenomenon is most common in those who have other evidence of severe involvement—for example, dyspnoea and marked growth failure; this complaint is relieved by a suitable operation—as is the true chest pain of older patients. It is possible that this "night-start" and discomfort are due to chest pain.

Ætiology.

Corday (1957) dismissed as a cause of this pain a decrease in coronary flow due to reflex vasoconstriction and mechanical hindrance to coronary sinus flow following a rise in right atrial pressure. He suggested that it was due to compression of the coronary vessels by a hypertensive pulmonary artery. Wood (1954) referring specifically to mitral stenosis, associated this symptom with insufficiency of the left coronary flow resulting from a

fixed low cardiac output. Stuckey (1955) extended this explanation of low cardiac output to the occurrence of the symptom in congenital heart disease, presuming a restriction of coronary flow as a result of decreased systemic output. Viar and Harrison (1952) suggested that the pain may itself come from a distended pulmonary vessel. Arterial anoxæmia was implicated as a cause by Brenner (1935). A wide variety of associations, implicating principally the left coronary bed, have then been described.

Comment.

There is no a-priori reason why this pain should not originate in the right ventricle, as a result of right coronary insufficiency. The opinions of Lasser and Genkins (1957), referring specifically to pure pulmonary stenosis, support this theory.

Table I outlines some of the associations of this type of pain, and separates the clinical groups in which it is found.

It is readily seen that while mitral stenosis, the malignant left-to-right shunt and cor pulmonale have in common a rise in pulmonary arterial pressure, this phenomenon does not occur in the tetralogy of Fallot; this condition features arterial unsaturation, as do some cases of cor pulmonale. Therefore explanations of chest pain invoking either desaturation or pulmonary hypertension are not completely satisfactory.

Although in most patients exemplified in the table, the pulmonary artery was dilated, this finding is absent in many patients with chest pain. Also the writer has encountered a case of infundibular pulmonary stenosis with this symptom; the pulmonary conus was concave on fluoroscopy. Thus this pain probably does not arise in a distended pulmonary artery.

While the cardiac output is admittedly low in mitral stenosis (Bayliss, Etheridge and Hyman, 1950), this is not so in many patients with inborn cardiac defects. In congenital heart disease as a whole, the cardiac index is within normal limits for patients of five years of age or more (Brotmacher and Deuchar, 1956). Specifically, the cardiac output in pure pulmonary stenosis is normal (Shepherd, 1955). Therefore there is no obvious conformity of cardiac output with chest pain either; this is emphasized by the presence of a high cardiac output in many patients with cor pulmonale (McMichael and Sharpey-Schaefer, 1944).

As far as left-sided coronary flow is concerned, it has been shown that this figure will decrease in severe mitral stenosis (Huston, Rowe, Weinstein and Crumpton, 1955). This is primarily a function of a fall in left ventricular work, not related absolutely to the fall in cardiac output. In cor pulmonale, the left-sided coronary flow is within normal limits (Rose and Hoffman, 1955). Thus again, a lesion of the left coronary bed does not entirely explain chest pain in these patients.

As the Table I suggests, the point of community is the right ventricular hypertension and increased right

TABLE I.
Features of Representative Patients with Chest Pain.¹

Features Exhibited by Representative Patients.						
Lesion.	Prominent Pulmonary Artery (by Cardiography).	Arterial Saturation.	Right Ventricular Pressure (mm. of Mercury).	Pulmonary Arterial Pressure (Mean; mm. of Mercury).	Right Ventricular Work Index (Kilograms per Metre per Minute, Square Metre S.A.).	
Mitral stenosis	Yes	95%	100/0	65.0	4.8	
Tetralogy of Fallot	No	71%	86/0	5.0	3.8	
Cor pulmonale	Yes	82%	66/0	40.0	4.1	
Atrial septal defect	Yes	92%	110/0	75.0	5.4	
Eisenmenger's syndrome	Yes	85%	120/0	67.0	3.9	
Isolated infundibular stenosis	No	98%	160/0	10.0	4.9	

¹ In each case the electrocardiogram showed right ventricular hypertrophy.

Note the absence of any other common features except right ventricular hypertension and increased right ventricular work index.

ventricular work. If this is so, the pain described may well be a result. Gregg and his colleagues (1943) have shown that right ventricular coronary flow will ultimately decrease in the presence of right ventricular pressure increase. This may have occurred in the patients here described, all of whom had electrocardiographic evidence of right ventricular hypertrophy—akin to the observations in pure pulmonary stenosis of Lasser and Jenkins (1957).

Conclusions.

Some thoughts are expressed on the incidence and aetiology of chest pain in various conditions not primarily associated with coronary sclerosis. A feature common to each clinical entity described is right ventricular hypertension with a subsequent increase in the work load of this chamber. Reasons are adduced for suggesting that anatomical or direct pressure phenomena need not be considered in the genesis of this pain, and that it probably does not originate in the left ventricle.

The sporadic appearance of the symptom is probably related to inconstantly occurring imbalance of right ventricular work to right coronary flow. This ratio is perhaps more readily upset when cardiac oxygen metabolism is perverted by arterial unsaturation. However, there is no published work on such a relationship, nor any guide to the level at which right coronary compensation may fail, so that no final opinion is possible on this point.

These observations would appear to extend and corroborate the suggestions of Lasser and Jenkins (1957) in their study of this symptom in patients with pure pulmonary stenosis.

Acknowledgement.

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Reports of Cases.

SPONTANEOUS PERFORATION OF THE COLON IN THE ABSENCE OF ANY PATHOLOGICAL CONDITION.

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PERFORATION of the colon may be the result of external trauma, instrumentation (sigmoidoscopic examination) or acute elevation of intracolonic pressure (compressed air or enema). When it occurs spontaneously it may be associated with neoplasm of the colon, tuberculous colitis, typhoid fever or foreign bodies, as reported by Hoffert (1946). Perforation has followed stercoral ulceration due to alkaline powders in the cases of Brearley (1954).

Spontaneous rupture of the sigmoid colon has also been seen in association with left inguinal hernia by Wilensky and Kaufman (1937), Berman and Rosner (1942) and Boffi (1944). In these cases there was a history of considerable muscular straining. Possibly the sudden increase in intraabdominal pressure causing the intracolonic pressure to be correspondingly raised results in the bowel rupturing opposite the internal ring, where there will be lack of support if a hernia or weakness is present.

Of extreme rarity are the cases of spontaneous perforation of the large bowel without a pathological lesion being present. In the case of Qvigstad (1950), this has occurred in the new-born baby. The pathogenesis in this case may have been a congenital defect in the muscular wall of the colon, as was suggested by microscopic examination at the autopsy. In the medical literature only five cases have been reported in adults. They are those of Boffi (1944), Brown (1944), Lataix (1949), Weinstein and Roberts (1952) and Eadie (1955).

Clinical Record.

The patient was a male, aged 54 years. He was admitted to the Royal Free Hospital, London, at noon on September 9, 1954, with the following history. At 6.30 a.m. on the day of his admission he had evacuated his bowels after five days of constipation. At the end of the act of defaecation, which had been rather forceful, he was seized with pain in the lower part of the abdomen, especially on the left side. The pain was constant, becoming more severe and generalized. There was no shoulder pain, nor was there any colic. The patient had not vomited and there was no nausea. He said that he had suffered from constipation during the last few years and that it was not unusual for him to go five or six days without evacuating his bowels. He had taken two doses of cascara three days before admission. There were no suggestive urinary symptoms, and at the time of admission he was gaining weight and his general health had been good.

The previous illnesses consisted of an appendiceal abscess, for which an appendicectomy was performed some four years previously, and a repair of a right inguinal hernia 25 years before.

The patient was a strongly built, middle-aged man who was obviously in considerable pain and shocked, with sweating and slight cyanosis of the lips, the lobules of the ears and the extremities. The respiration was thoracic in type. The pulse rate was 110 per minute and the respiration rate 24 per minute. The tongue was furred and dry. The heart was normal, apart from its rapid rate, and the blood pressure was 100/60 mm. of mercury. In the lungs could be heard scattered rhonchi, but otherwise the respiratory system was normal. The abdomen did not move on respiration, and generalized rigidity and tenderness were present. The tenderness was more severe in the lower part of the abdomen. No mass was present,

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neither was there any alteration of liver dullness, and no free fluid could be detected clinically. The bowel sounds were absent.

On rectal examination, there was marked tenderness in the recto-vesical pouch, but no mass could be felt. An X-ray film of the abdomen showed no subphrenic gas or distended bowel. The bladder was catheterized and a few ounces of urine were withdrawn. Diffuse peritonitis was diagnosed, possibly due to perforation of a diverticulum in the sigmoid colon. A Ryle's tube was introduced into the stomach. A regime of intravenous therapy and antibiotics was commenced, and two hours later operation was performed. At laparotomy generalized peritonitis of recent onset was found and a faecal smell was detected. Two hard boluses of faeces were present in the pouch of Douglas, and a tear measuring 1.25 in. across the antimesenteric border of the distal part of the sigmoid colon was seen. There was no sign of neoplasm, diverticulitis or diverticulosis, and no foreign body was present. The faecal material was removed from the peritoneal cavity, the perforation was sutured, a transverse colostomy was established and a drain was inserted into the pelvis.

The patient made a good recovery from the operation, his temperature subsiding to normal a week later. However, 14 days after the operation his temperature began to swing and abscess formation was suspected. A small wound abscess was present.

Rectal examination revealed no abnormality, but radiological examination showed the right lobe of the diaphragm to be considerably elevated. There was a small pleural effusion at the base of the right lung. The diaphragmatic movement was not impaired. At this stage the white cell count was 19,400 per cubic millimetre, and a provisional diagnosis of subphrenic abscess was made. The patient was given streptomycin, "Terramycin", penicillin and "Sulphatriad", the last of these being given on September 21. His general condition at this stage was very good, and within a fortnight the temperature was seen to be settling; it was normal on October 22, although there was still some elevation of the right dome of the diaphragm. The white cell count had fallen to 11,000 per cubic millimetre. A barium-enema X-ray examination was performed on October 7, and, apart from a small, ragged area where the bowel had been sutured, there was no abnormality to be seen. There was no suggestion of a neoplasm or diverticulosis.

On November 15 the colostomy was closed intraperitoneally. At this time sigmoidoscopy was performed, the instrument being inserted 23 cm., and no abnormality was seen in the bowel.

The patient was discharged on December 12, 1954.

Discussion.

The history of the onset of the pain at the end of the act of defaecation, and the early pain in the lower part of the left side of the abdomen suggested possibly that the patient was suffering from sigmoid diverticulitis with perforation. However, when he was examined one could only confidently diagnose a generalized peritonitis. There was no history of trauma or rectal interference. This case resembles that of Weinstein and Roberts (1952), in that the patient was very constipated (it was five days since his bowels had opened).

The fact that the colon contained firm faeces influenced the treatment, so that a transverse colostomy to divert the faeces was performed in addition to suture of the perforation. This was done in two layers, all coats being secured by a continuous suture with chromicized 2/0 gut, and the sero-muscular wall being secured by interrupted silk sutures. The pelvis was also drained.

The colostomy was closed some eight weeks later. At the time of laparotomy no pathological lesion could be found, and since then, two barium-enema X-ray examinations and a sigmoidoscopy (the instrument being inserted 23 cm.) have failed to reveal any abnormality. Possibly, although no left inguinal hernia was present, there may

have been a weakness at the left internal abdominal ring, diminishing the support to the bowel at this site at the time of straining. Another factor may have been stercoral ulceration associated with the constipation, although the edges of the tear appeared clean and not inflamed. In Brearley's (1954) case, after alkaline medication acute stercoral ulceration was present.

In the pelvic colon there was a perforation about 1 cm. across on the antimesenteric border. Around its edge was a ring of necrotic tissue about 1 mm in width.

Summary.

An extensive search of the twentieth century medical literature revealed similar cases in England, the United States of America, Argentina and France. (The cases occurring among new-born infants are probably due to congenital defects in the sero-muscular wall of the colon, and are not included.)

Two cases have been reported after alkaline medication by Hoffert (1946) and Brearley (1954).

This is presented as the sixth case of spontaneous perforation of the sigmoid colon in the absence of any pathological condition.

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ILLNESS SIMULATING PARALYTIC POLIOMYELITIS ASSOCIATED WITH COXSACKIE GROUP A TYPE 4 VIRUS INFECTION.

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WIDESPREAD use of the Salk poliomyelitis vaccine has reduced considerably the incidence of paralytic poliomyelitis, and at the same time has brought to attention the occurrence of cases of illness clinically indistinguishable from paralytic poliomyelitis, but apparently caused by other viruses. These other viruses are rare causes of paralytic illness compared with the polioviruses in a susceptible community, but in a vaccinated community they may constitute a substantial proportion of cases. It is important to detect other aetiological agents in

poliomyelitis-like illnesses in order that these cases are not considered to be failures of vaccination. The poliomyelitis vaccine as constituted at present can only be expected to protect against the three known types of polioviruses.

In addition to the polioviruses there are 58 serotypes of other enteroviruses known at present, subdivided into Coxsackie Group A, Coxsackie Group B and ECHO viruses. All enteroviruses multiply in the human alimentary tract and are excreted in the faeces, and some of the enteroviruses share with the polioviruses the ability to invade the central nervous system in a proportion of cases of infection. The most common manifestation of central nervous system infection by the non-polio enteroviruses is benign aseptic meningitis, formerly often called non-paralytic poliomyelitis. Epidemics of aseptic meningitis due to a particular type of enterovirus have been described, the types most frequently implicated being Coxsackie viruses of Group B, types 1, 2, 3, 4 and 5, and ECHO viruses, types 4, 6 and 9 (Karzon, 1959).

Infection by non-polio enteroviruses accompanied by overt paralysis is usually a sporadic occurrence, and the following viruses have been recognized as aetiological agents in reviews by Steigman (1958) and Dalldorf (1960): (i) Coxsackie Group A viruses, types 7 and 9; (ii) Coxsackie Group B viruses, types 2, 3, 4 and 5; (iii) ECHO viruses, types 2, 4, 6, 9 and 16.

Many enteroviruses are highly infectious, are widely distributed during epidemic periods and can be isolated from apparently healthy persons in addition to those with overt disease; therefore all epidemiological and virological data must be carefully considered before a virus isolated from faeces or throat washings is incriminated as the cause of a contemporaneous central nervous system illness. The paralytic illnesses due to enteroviruses other than polioviruses are not usually fatal, so that nervous tissue has been only rarely available to prove by direct examination that a particular enterovirus infected the central nervous system.

We report here a case of acute illness considered on clinical grounds to be paralytic poliomyelitis in a child who had received three doses of potent Salk vaccine. Coxsackie Group A type 4 viruses only were isolated from the patient, and we believe that this virus was responsible for the paralytic illness.

Coxsackie A4 viruses have not been previously accepted as having the potential to cause paralysis, but other workers in Australia (Stanley and Dorman, 1953), in America (Howitt, 1950) and in South Africa (Gear, 1960) have reported the association of this type of virus with poliomyelitis-like illnesses.

Clinical Record.

The patient, a girl, aged eight years, first became unwell on or about December 28, 1958, when she had a mild non-specific illness lasting several days, which was described by her mother as a cold. The only definite complaint at that time was that the throat was sore. Four days after this episode the patient complained of pain in the back of the neck and "pins and needles" in the left arm. The following day she complained of earache, which was relieved by "Disprin", and in the afternoon she seemed better and played with the other children. The next morning she complained that she could not lift her left arm properly. This weakness did not improve over the next two days, and she continued to be listless and anorexic. She was then taken to her doctor, who observed weakness of the muscles of the left shoulder and upper arm, and also otitis media. She was admitted to hospital on the following morning (January 7, 1959), where examination showed that her temperature was 99.8° F. (37.7° C.), and her pulse rate was 104 per minute; there was also marked weakness of the left deltoid muscle and moderate weakness of the left latissimus dorsi, supraspinatus and internal and external rotator muscles. Otitis media was also present. No neck stiffness or other abnormality was observed. Her illness was diagnosed as

paralytic poliomyelitis, and was treated with strict bed rest, with the left arm supported in semi-abduction by pillows, and chloramphenicol was given orally for the accompanying ear infection.

A low-grade fever persisted during the first four days of the patient's stay in the hospital, but there was no change in the amount of paresis. Some return of power in all the affected muscles was noticed by the time the patient was discharged from hospital ambulant on January 31, 1959. She continued treatment, as an out-patient supervised by the physiotherapist, with her arm supported in an abduction frame except when sleeping and when carrying out graded exercises. The power in the affected arm continued to increase, and at the end of three months all muscles were considered to be normal. The assessment of power of the affected muscles of the left arm by the physiotherapist at various stages of the disease is shown in Table I.

TABLE I
Serial Evaluation of Strength of Affected Muscles of Left Shoulder and Upper Arm of Patient.¹

Muscles.	Power.			
	12/1/59.	27/1/59.	10/2/59.	22/4/59.
Deltoid	2	3	4	5++
Supraspinatus ..	3	4	4+	5++
Latissimus dorsi ..	3	4	4+	5++
Internal rotators ..	3+	4	4+	5++
External rotators ..	3+	4+	4+	5++
Serratus anterior ..	4	4+	4+	5++
Elbow flexors ..	4	4+	5	6
Triceps	4	4+	5	5++
Trapezius	4	4+	5	5++
Pectoralis	4	4+	5	5++

¹ Grading: 0 = muscle incapable of contraction; 1 = minimal movement; 2 = joint movement with gravity eliminated; 3 = antigravity movement; 4 = movement against gravity and resistance; 5 = movement against gravity and increased resistance; 6 = normal.

The patient lived with her parents and five siblings, aged nine years, six years, four years, three years and twenty months respectively, in a partly cleared farming and timber-milling district in the mountainous region 30 miles from Murwillumbah. The mother had noticed that the three youngest children had been unwell about the same time as the patient; all three had been feverish, and the youngest had had a very red throat with white spots.

All the children in the family had completed the course of three doses of Salk vaccine; in the case of the patient the first two doses were given in October and November, 1956, and the third dose in November, 1957.

Virus Laboratory Studies.

Specimens of faeces were obtained from the patient on January 9, 1959, and January 13, 1959; the first serum specimen was collected on January 9, 1959, and the second serum specimen on February 9, 1959. A single specimen of faeces and a specimen of serum were collected from each member of the patient's family and also the neighbouring family on January 13, 1959, and a second serum specimen was collected from each on February 9, 1959. Portion of each specimen of faeces was prepared as a 20% suspension in Hank's buffered salt solution. Of this suspension 0.5 ml. was inoculated into each of 10 tubes of monkey kidney tissue culture, and three serial passages were carried out, but in no case was a cytopathogenic agent isolated.

A volume of 0.05 ml. of suspension was inoculated into each member of a litter of newborn mice, a separate litter being used for each specimen. An agent lethal for suckling mice was isolated from both specimens of faeces from the patient and from the specimen from each of four of her five siblings. This agent was neutralized by antiserum prepared against the prototype Coxsackie Group A type 4 virus. An antiserum prepared in mice against the virus isolated from one sibling specifically neutralized the viruses from the patient and also those from the four siblings, and also neutralized prototype Coxsackie A4 virus. The antiserum was prepared against the sibling's virus rather than the patient's virus to reduce the possibility of confusion if the isolate from the patient happened to be a mixture of viruses. The results obtained indicate that in each instance only Coxsackie A4 viruses were present in the faeces.

TABLE II.
Titres of Antibodies to Various Viruses in Acute and Convalescent Phase Sera of Patient.

Date of Collection of Serum Specimen.	Antibody Titre.							
	Coxsackie A 4 Virus.	Poliovirus Type 1.	Poliovirus Type 2.	Poliovirus Type 3.	M.V.E. Virus.	Dengue Type 1 Virus.	Dengue Type 2 Virus.	Mumps Virus.
9/1/1959	83,180 ¹	256	256	64	<6	<10	<10	< 8
9/2/1959	38,900 ¹	1024	256	16	<6	<10	<10	<8

¹ Neutralization indices.

A test for the presence of neutralizing antibodies against the patient's virus in the patient's two serum specimens was carried out in suckling mice. Normal rabbit serum was used as the control. Each serum was diluted tenfold and a fixed amount of the diluted serum was mixed with an equal volume of serial tenfold dilutions of virus suspension. The LD₅₀ (Reed and Muench, 1938) of the control virus preparation was 10^{-7.44} per 0.05 ml., and the LD₅₀ of the virus and acute phase serum mixtures was 10^{-3.22} and the LD₅₀ of the virus and convalescent phase serum mixtures was 10^{-3.35}, so that the neutralization indices were 83,180 and 38,900 respectively. This indicates that the levels of neutralizing antibody against Coxsackie A4 virus in the two sera were high and not significantly different.

The sera from the one sibling from whose faeces no virus was isolated had a high level of antibody in both specimens; a 1 in 1000 dilution of serum neutralized 100 LD₅₀ of virus.

The patient's two serum specimens were tested for antibodies to the three types of polioviruses in monkey kidney tissue culture. The antibody titre is the reciprocal of the serum dilution at which two out of four tubes were protected from the effect of 30 LD₅₀ of the given type of virus. The results are shown in Table II. There is a fourfold variation in titre between acute and convalescent sera in the case of two types of poliovirus, and this is within the limits of experimental variation with this method.

The sera were also tested for the presence of antibodies against mumps, Murray Valley encephalitis and dengue viruses. All gave negative results.

The virus excreted by the patient was tested for neuro-pathogenicity in two cynomolgus monkeys. One monkey received 1 ml. intracerebrally and 0.1 ml. intraspinally of suspension of the first specimen of faeces from the patient. The viruses contained in the original 20% suspension of faeces were concentrated tenfold by high-speed centrifugation with 0.03% gelatin added to the suspension to aid precipitation of the viruses. No paralysis was observed in this monkey, and after 21 days the animal was killed and its brain and spinal cord were examined by Dr. Ross Anderson, lecturer in neuropathology at Melbourne University. He found no lesions suggestive of poliomyelitis on macroscopic and microscopic examination.

The other monkey was inoculated with 10% suspension of muscle and brain tissue of mice sick with infection in the first mouse passage of the faecal suspension. This monkey showed weakness of the left forelimb three days after inoculation and weakness of the left hindlimb seven days after inoculation, which persisted until the twenty-first day, when the animal was killed. Dr. Anderson examined the brain and spinal cord, and again found no evidence of virus infection of the central nervous system, but there was hemorrhage around the needle track in the right parietal region, which may have accounted for the hemiparesis.

The monkey inoculated with the faecal suspension showed no antibodies against the three types of polioviruses, but did develop antibodies against Coxsackie A4 viruses, with a neutralizing index of at least 1000. This indicates that this strain of virus, although not neurotropic to the monkey, probably did multiply in some portion of the body. The absence of antibody response to any type of poliovirus is also further evidence that polioviruses were not present in the faeces.

Discussion.

The failure of the virologists to isolate polioviruses from either of the specimens from the patient using a tissue culture technique known to be effective in isolating polioviruses is suggestive that polioviruses were not infecting the patient, and the significance of this observation is increased by their failure also to isolate polioviruses from any of the patient's family contacts. It is well known that intrafamily spread of polioviruses occurs frequently,

and also that bowel infection and excretion of viruses may still occur despite previous vaccination (Gelfand, Fox and Le Blanc, 1956). There were also no other cases of poliomyelitis in the region in which this case occurred for many months before and after the illness studied, which also suggests that polioviruses were not epidemic in the area. Most children below the age of 15 years had been vaccinated at that time, but many people over the age had not been vaccinated, and could have been susceptible. Some of these may have acted as markers if polioviruses had been present in the locality. In Australia during the three-year period 1953-1955, before poliomyelitis vaccination was commenced, 40% of all patients notified as victims of poliomyelitis were aged 15 years or more (Graydon, unpublished data).

The isolation of Coxsackie A4 viruses from the patient in two specimens demonstrates active infection, and the antibody levels in the two sera are compatible with recent infection. The finding of similar viruses in faeces from four siblings indicates also that Coxsackie A4 viruses were epidemic in the family. The non-specific illnesses in the other children during the time that the patient's disease was incubating could have been due to Coxsackie viruses, and the white spots noticed by the mother in the baby's mouth are suggestive of the vesicles of herpangina, a syndrome which, it is already known, can be caused by Coxsackie A4 viruses. The patient had no contact with the family after going to hospital, which suggests that she was infected whilst at home and therefore in the earlier stages of the illness. It has been demonstrated that enteroviruses are very infectious within hospitals, and this must be kept in mind when assessing the role of a virus collected from the faeces of a patient in hospital.

The antibody titres to Coxsackie A4 viruses in the acute and convalescent sera were not significantly different. This could be expected, as the first specimen was not collected until 12 days after the beginning of the illness, and six days after the onset of paralysis. In paralytic illness due to polioviruses the antibody titre has often reached peak levels by the time paralysis is observed. The levels of antibody against the three types of polioviruses are compatible with recent infection, but they are more likely due to the completed course of Salk vaccination. It is known that the vaccine, which was made by Commonwealth Serum Laboratories, was of the potency described by Bazeley (1956) and was kept refrigerated until used within two months of its date of issue, a period of time in which the drop in potency would be insignificant.

The patient's serum specimens also showed no evidence that the patient had been infected with mumps, Murray Valley encephalitis or dengue viruses; and there was no clinical evidence of disease due to these viruses in the area at the time the patient was ill. It was considered necessary to show that the patient had not been infected by any of these viruses at the same time as she had been infected with the Coxsackie A4 viruses, because it is possible that these other viruses may also cause paralytic illness occasionally. Lennette, Caplin and Magoffin (1960) have recently shown that the mumps virus can cause a mild paralytic illness similar to poliomyelitis.

The possibility that Murray Valley encephalitis and dengue viruses might also cause paralytic illness is based on the findings overseas that other Group B arboviruses, St. Louis encephalitis virus (Lennette, Magoffin, Schmidt and Hollister, 1959) and louping ill virus (Likar and

Dane, 1958) can cause illnesses similar to paralytic poliomyelitis.

It was thought that the strain of Coxsackie A4 virus infecting the patient may have had neurotropic properties, but we were not able to demonstrate this conclusively in the two inoculated monkeys. One monkey did show mild hemiparesis, but microscopic examination did not show neuronal damage, and it is possible that the lesions resulted from inoculation trauma. Up to date only two types of Group A Coxsackie viruses have been found to be neurotropic for monkeys; these are Coxsackie A7 (Voroshilova and Chumakov, 1959) and Coxsackie A14 (Dalldorf, 1957).

Recently there has been evidence that some strains of Coxsackie A4 virus are neurotropic for humans. Gold, Carver, Heineberg, Adelson and Robbins (1961) investigated a series of unexpected deaths during infancy, and isolated Coxsackie A4 viruses from the brain tissue of six dead infants.

The evidence presented suggests that Coxsackie A4 viruses were the only viruses with neurotropic potential infecting the patient during her illness, and that they presumably caused the paralysis observed.

The findings in various countries that many types of enteroviruses can infect and damage the central nervous system is disquieting. The possibility must be considered that some of them may become increasingly important owing to changes in such factors as ecology and host-parasite relationship in the same way that polioviruses became increasingly important during the 70 years before vaccination against poliomyelitis became available.

Summary.

A case is reported of an acute paralytic illness clinically indistinguishable from paralytic poliomyelitis. Only Coxsackie Group A type 4 viruses were isolated from the patient, and epidemiological and laboratory studies suggest that this type of virus was responsible for the central nervous system infection.

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LEPTOSPIROSIS ACQUIRED FROM SOIL.

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WHILST water has long been recognized as an important agent for the transmission of leptospires from animals to man, less regard was given to their survival in soil till the investigations of Smith and Self in 1955. They were able to demonstrate the survival of leptospires in culture-infected soil for 43 days and in uninfected soil for 15 days. Under natural conditions in the canefields the soil becomes contaminated by rodents, and after rain the surface waters are contaminated by migration of the leptospires from the soil, probably more commonly than through direct contamination by the carriers.

As far as is known there are no reports of soil acting as an agent in transporting infection from one locality to another. In this regard the following case presents unique features.

Clinical Record.

A male scientist, aged 47 years, was engaged in the examination of soil samples for the presence of nematodes. The samples were usually about 800 grammes in weight and collected from certain test areas as a vertical sample with a circular auger, to a depth of 20 cm. The soil was placed in plastic bags for submission to the laboratory. On arrival it was broken up by bare hands and forced through a coarse sieve, a manipulation taking about five minutes.

On November 17, 1960, a soil sample was processed which had been collected on a cane farm at Mossman in North Queensland 48 hours previously and then forwarded in a plastic bag by car and train the 1100 miles to Brisbane without any special treatment. The soil sample was peaty, extremely moist and of pH 5.5.

On November 25, eight days after his examination of this particular sample, the man became ill with a fever and severe headache. This was followed next day by vomiting, rigors and a temperature of 104° F. On November 27, jaundice was noted, the urine became "black" and the patient was very ill; his condition necessitated his admission to hospital. The high fever, rigors and vomiting continued for four days and the jaundice was visible for one week. There was marked tenderness in the right subcostal area, but the liver was not palpable. The fever lasted for 10 days after which steady recovery occurred, and the patient was discharged on December 13, 19 days after the onset of the illness.

On the sixth day of the illness the serum bilirubin level was 2.0 mg. per 100 ml. and the alkaline phosphatase level was 33 units. These figures were respectively 0.5 mg. per 100 ml. and 20 units on the thirteenth day. At

this time also there was a total leucocyte count of 19,000 per cubic millimetre, with 77% neutrophils. Serum was obtained from the patient on the eleventh, nineteenth and forty-seventh days of the disease and was tested for evidence of brucellosis, typhoid, paratyphoid, typhus and Q fever. In addition agglutination tests were performed using the 14 serotypes of the genus *Leptospira* known to occur in Queensland. The antibody titres obtained are set out in Table I.

TABLE I.
Antibody Titres¹ Found in Investigation of Patient.

Antigen.	Antibody Titre.		
	Eleventh Day.	Nineteenth Day.	Forty-seventh Day.
<i>Leptospira australis</i> ..	—	100	300
<i>Leptospira exposita</i> ..	100	1000	300
<i>Leptospira grippityphosa</i> ..	100	1000	300

¹ Titres are expressed as the reciprocal of the highest serum dilution (final) giving at least one plus agglutination.

These agglutination titres were consistent with the patient's having had a recent infection with leptospirosis and the agglutination pattern was strongly suggestive of infection with *Leptospira grippityphosa*. Unfortunately no cultures were made early in the disease to enable positive confirmation of the infecting serotype, and attempts to recover the leptospira from the urine during convalescence were unsuccessful.

Epidemiology.

Apart from scrub typhus in 1952, the patient had no relevant previous medical history. He had not been exposed to any known risk of acquiring leptospirosis for three months prior to November. Only three samples of soil had been examined during November and these occasions were respectively 19, 18 and eight days prior to the onset of the illness. The first two of these samples were from southern Queensland, where leptospiral infections with this serological pattern are unknown. The third sample was collected in Mossman from the same locality where *L. grippityphosa* was originally isolated in Australia in 1954 (Smith and Brown, 1954). Infections with this serotype are extremely rare in Australia, this primary isolation being the only one from a human. The present patient is only the second to present this unusual serological pattern in this country. There seems little doubt that the leptospiral infection resulted from contact with the soil sample from Mossman and that the incubation period was eight days.

In January, 1961, two further samples of soil were obtained from Mossman—one from the cane farm from which the contaminated sample had come and one from an adjoining farm. An attempt was made to recover leptospires from these samples using the subcutaneous stream method of inoculation with four guinea-pigs for each sample (Van Thiel, 1948). Despite passage into four additional guinea-pigs, no evidence of infection was obtained and agglutination tests on the guinea-pig sera gave negative results. Although the latter soil samples were of satisfactory moisture content, the failure to recover leptospires was not surprising in view of the lapse of time since the original sample was obtained.

This infection emphasizes the part played by soil in harbouring leptospires and the potential risk of handling such soil without gloves. The survival of the leptospires in the soil during a 48-hour train journey of 1100 miles is worthy of record.

Summary.

A soil scientist became infected with leptospirosis in Brisbane after handling a soil sample. This had been collected in Mossman, North Queensland, and transported 1100 miles, during a period of 48 hours. The infection

was most probably due to *L. grippityphosa* and the incubation period was eight days. The unusual mode of transfer of the infection and the potential danger of handling soil samples without gloves are worthy of note.

Acknowledgements.

We are indebted to the patient for arranging to have soil samples sent for examination and for submitting to additional serological investigations, and also to both Dr. Bruce Biggs and Dr. J. G. Squires for kindly supplying information concerning the course of the illness.

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SMITH, D. J. W., and SELF, H. R. M. (1955), "Observations on the Survival of *Leptospira australis* A in Soil and Water", *J. Hyg. (Lond.)*, 53: 436.
VAN THIEL, P. H. (1948), "The Leptospiroses", Universitaire Pers Leiden, Leiden: 78.

Reviews.

The Pathology of Cerebral Palsy. By A. Towbin, M.D.; 1960. Springfield, Illinois: Charles C. Thomas; Oxford: Blackwell Scientific Publications; 1961. 9" x 6", pp. 216 with illustrations. Price: 64s. (English).

THE author's purpose is stated to be to provide a trans-sectional view of the basic pathology of cerebral palsy. The earlier chapters dealing with the lesions resulting from neonatal or foetal anoxia are valuable, representing, as the author freely acknowledges, the views of the German school of neuropathologists. Little of this work is available in English, and it is generally difficult to obtain. The basic principle of elective parenchymal necrosis resulting from anoxia provided the key to the analysis of the cerebral lesions which follow, and allows of such diverse entities as mantle sclerosis, porencephaly and status marmoratus to be drawn into a unified concept. A correlation between the severity of the anoxic process and the cerebral lesions is well presented. The illustrations in this section are beautifully reproduced and very instructive. Many of the difficulties are glossed over to produce a more readable account.

The later sections on local intracranial processes and congenital deformities do not reach the standard set by the earlier chapters. The treatment is, in parts, so brief as to be of little value, and many sections are singularly devoid of references.

This little book provides a lot of useful information for those with interests in this confusing field.

Electrical Studies on the Unanaesthetized Brain. Edited by Estelle R. Ramey, Ph.D., and Desmond S. O'Doherty, M.D.; 1960. New York: Paul B. Hoeber Inc. 9" x 6", pp. 442, with 252 illustrations. Price: \$6.00.

THIS interesting book is a collection of papers presented at a symposium held in the Department of Neurology at Georgetown. The central theme is the "limbic system", that portion of the cerebrum, morphologically the rhinencephalon, which in the higher animals and man is concerned with the emotional behaviour of the individual. This is a recently developed and intriguing field, which shows promise of drawing together the otherwise remotely related disciplines of neurophysiology, neurosurgery, psychology and psychiatry. The participants include experts in these departments, and the representation is indeed international; there are contributions from the Swedish and British teams.

Despite the necessarily great variation in material and presentation, careful ordering has permitted a logical development of the theme: first, the neuroanatomical basis, then neurophysiological aspects in animals and, lastly, the neurosurgical approach in humans. Electrical stimulation of the deep grey masses of the anterior part of the cerebrum is shown to evoke the sensation of pleasure as well as other highly ordered and sophisticated complexes. We are, as David McK. Riech states in summing up, indeed at "... the coming of age of the opening of the 'black box' of the mind."

A detailed discussion is given of the elaborate techniques required to introduce and maintain implanted electrodes

over long periods of time (up to two years) in animals and humans, and it is instructive to compare the methods and results of the different teams.

Each paper is followed by a verbatim account of discussion and questions by the other members of the symposium. This fulfils a valuable function in a book of this kind in providing orientation on the train of thought of the leaders in the field. Detailed bibliographies appear after most of the contributions, and the interested reader will thereby have ready access to most of the significant literature in the field.

This is a book of great interest and value to neurophysiologists, clinical neurologists and psychologists. It is a timely survey of progress in the rapidly advancing field of emotional behaviour.

Neurovascular Compression Syndromes of the Shoulder Girdle. By Louis M. Rosati, M.D., and Jere W. Lord, M.D.; 1961. New York and London: Grune & Stratton. 9" x 6", pp. 176, with illustrations. Price: \$7.25.

This is one of a series of modern surgical monographs published in New York under the general direction of Dr. I. S. Ravdin. As expected, it leaves nothing to be desired as regards the publication itself, and the authors present their own views and experience on this subject with considerable clarity. They review the anatomy and physiology of the thoracic inlet and discuss the differential diagnosis and treatment of the clinical syndromes which are often considered to arise in this area.

It is almost unbelievable, but true, that only a short passing mention is made of the carpal tunnel syndrome even in differential diagnosis. It is not suggested that this condition is responsible for all pain extending to the fingers; but it is not uncommon now for patients, having the median nerve released at the wrist, to bear a scar at the root of the neck, resulting from an operation done in good faith some years ago.

Those who are interested in this subject—a field where neurosurgeons and orthopaedic surgeons often overlap—will be disappointed that there are only 15 references to the world literature on the subject outside the United States of America. This book will help to clarify some problems and at the same time will give rise to others; but it must not be thought that it is the last word on this fascinating subject.

Techniques of Thoracotomy. By B. T. Le Roux, M.B., Ch.B., F.R.C.S.E.; 1961. Edinburgh and London: E. & S. Livingstone Ltd. 9½" x 7", pp. 84, with many illustrations. Price: 55s. net (English).

This book describes the operative techniques necessary to gain access to the heart and lungs. Practical points are described in detail in each section, including methods of posturing and draping the patient. The methods described are presumably those in use in the Regional Thoracic Unit in Edinburgh, and this may explain why the author tends to approach his subject with the reverence of the devotee. Although suffering a little on this account, the techniques described are sound in principle and the manner of presentation is good. One criticism can be offered. It would appear that the surgical rituals described do not permit the use of the diathermy. Few thoracic surgeons would agree with this.

This book has been written for the uninitiated, so that great care has been given to describing minor operative details which are usually omitted. This raises an important point. It is a sobering thought that any surgeon should be so lacking in training that he should need to consult a book on the minor part of an operation which is often complex and always requires highly-trained staff to bring about a successful conclusion.

The University of Glasgow Through Five Centuries. Published by The University in Commemoration of the Fifth Centenary, 1951. 9½" x 7", pp. 96, with many illustrations. Price: not stated.

The university as we know it today was the product of medieval times, and some of the more famous foundations still in existence have functioned continuously since their establishment as early as the twelfth and thirteenth centuries. The original *Studium Generale* was intended to serve as a teaching centre of higher education open to all scholars with a working vocabulary of Latin, and it sought to take in all knowledge as its province. However, the first

universities were essentially Christian and ecclesiastical institutions, whose teaching, organization and privileges were entirely subservient to the temporal and spiritual interests of the Church.

In Scotland, the University of St. Andrews had been already established early in the fifteenth century when it showed signs of prospering under the beneficent guidance of clerical authority. The next foundation took much longer to arrive at maturity. In 1451, James II, King of the Scots, requested William Turnbull, Bishop of Glasgow, to make application to Pope Nicholas V that official sanction be granted for the setting up of a *studium generale* in the town of Glasgow. This university entered upon its long and chequered career with the arrival of a charter bearing the papal *bulia* or seal from the Vatican in Rome.

To commemorate the fifth century of academic usefulness, the authorities of the University of Glasgow have published a fine record of its progress. A limited space has been allotted for the letterpress, but the publication is mainly distinguished for its many excellent illustrations of the ancient and modern buildings and the photographs of teachers and administrators who have been responsible for progress in the last one hundred years. This handsome production is sure to be treasured by all those associated with this famous university.

Varicose Veins: A Practical Manual. By R. Rowden Foote; third edition, 1960. Bristol: John Wright & Sons Ltd. 9½" x 6½", pp. 378, with many illustrations. Price: 63s. (English).

This is a publication of considerable value. Of 356 pages and index, with eight coloured plates and nearly as many illustrations as pages, it is a mine of information for those academically inclined and a source of sound advice for those dealing practically with the subject of varicose veins. This edition atones for some of the shortcomings of the previous edition, which neglected the stripping operation and advocated the use of local anaesthesia.

In his advice on the management of phlebitis, the author considers that "Butazolidin" is of little value, and that localized phlebitis of the superficial veins of the lower part of the leg does not call for a display of anticoagulants and immobilization. With this many of those in this country interested in the subject would agree. The same applies to his adverse criticism of popliteal and femoral ligations, of sympathectomy for ulceration, of Linton's subfascial operation, and of the local use of penicillin and sulphonamide powder in the treatment of leg ulcers.

This book will be appreciated by all interested in varicose veins, their management and treatment.

Hæmophilic Diseases in Denmark: A Classification of the Clotting Defects in 75 Hæmophilic Families. By Knud-Eric Sjølin, M.D.; 1961. Oxford: Blackwell Scientific Publications. 9½" x 6½", pp. 350 with figures. Price: 35s. (English).

SJÖLIN continues the chronicle of Scandinavian hæmophilias, adding 148 affected Danes to the patients studied by Skold in Sweden and by Ikkala in Finland. He uses the thrombin generation test to classify the coagulation defects, instead of the more widely used thromboplastin generation or prothrombin consumption tests and their modifications. The thrombin generation test has been championed for several years by the author's senior colleague, Astrup. Outside Denmark it has been little used as a diagnostic method, and there is no doubt that several controversial findings in this survey are a direct result of certain shortcomings of this test, reviewed recently by another Danish worker, Ollendorff.

Outstanding is the discovery of 11 patients with Hageman factor deficiency, all with hæmorrhagic disease, including hæmarthroses. This is in complete disagreement with other views on this factor, the deficiency state of which is characterized by a gross clotting defect *in vitro* associated with entirely normal hæmostasis. Another unique syndrome described was a severe form of hæmophilia in which factor VIII (AHG) deficiency was combined with an unidentified serum factor called the freezing/serum factor. It seems from the text that this serum factor probably represents an artefact introduced *in vitro*, and that the patients were actually deficient in either factor VIII or factor IX (Christmas factor). Other points which differ from usual findings include a low relative incidence of factor VIII deficiency (49% of patients instead of 75% to 85%), a low incidence of new cases appearing by mutation (17% instead

of 25% to 40%) and considerable quantitative variation of the factor level over intervals of time in an individual.

Sjölin completed this work in 1958, and so did not have the benefit of recent data on the newer clotting factors which might have helped to resolve many of the problems that arose. This, together with the difficult technical nature of the investigations used, makes most of the book of interest only to the research worker in blood coagulation. Of wider interest is some useful information on clinical features and genetics. Careful family pedigrees and individual case histories form a large appendix. The English translation is quaint but comprehensible.

Clinical Neurology. By Sir Russell Brain, D.M., F.R.C.P. (Lond.). 1960. London: Oxford University Press. 9½" x 6½", pp. 406, with illustrations. Price: 63s.

THIS is an important addition to neurological literature. It is written by one of the leading neurologists in the United Kingdom, Sir Russell Brain, who is also a distinguished writer in other fields. The author points out that this manual is not a smaller version of his "Diseases of the Nervous System", which, since its appearance in 1933, has already run through numerous editions. This book is a blueprint of the way in which a distinguished neurologist thinks neurology should be taught and the methods he has used in teaching it. The work is in five sections. The first naturally deals with the anatomical and physiological basis of symptoms and signs; this, as in all clinical medicine, should provide the foundation upon which should develop an understanding of the deviations from normal that constitute disease. In the next section, disorders of anatomical regions—brain, spinal cord, nerve roots and muscle—are discussed. Then follow sections dealing with infections like poliomyelitis, meningitis and syphilis of the nervous system; systemic disorders such as the ataxias, multiple sclerosis and motor neuron disease; and finally a brief discussion of the psychological aspects of neurology.

Throughout the work the clinical wisdom of the author is apparent. Those preparing for examinations will find it useful, for, consciously or unconsciously, the author, who has examined both undergraduates and graduates for many years, seems to have answered many of the questions universally beloved by clinical examiners in neurology. No student of the subject, be he undergraduate or graduate, should be without this well-written and well-produced practical manual.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Year Book of Dermatology", 1960-1961 Year Book Series, edited by Rudolf L. Baer, M.D., and Victor H. Witten, M.D.; 1961. Chicago: Year Book Medical Publishers. Sydney: W. Ramsay (N.S.W.) Pty. Ltd. 7½" x 5¼", pp. 478, with illustrations. Price: 99s.

"Principles of Medical Statistics", by A. Bradford Hill, C.B.E., D.Sc., Ph.D., F.R.S.; seventh edition, revised and enlarged; 1961. London: The Lancet Limited. 8½" x 5¼", pp. 368. Price: 12s. 6d. net (English).

"C. I. Parhon: Opere Alese, Vol. IV: Hipofiza, Epifiza, Suprarrenală, Pancrăns. Ovar St. Tesiculi", edited by Acad. St. M. Micu; 1961. Editura Academiei Republicii Populare Romine. 9½" x 6½", pp. 638, with illustrations. Price not stated.

"Home Treatment in Injury and Osteoarthritis", by W. E. Tucker, C.V.O., M.B.E., T.D., M.A., M.B., B.Ch., F.R.C.S.; 1961. Edinburgh, London: E. & S. Livingstone. 8½" x 5¼", pp. 80, with illustrations. Price: 10s. 6d. (English).

"Diseases of the Intervertebral Disc and its Surrounding Tissues", by Reuben Rabinovitch, B.A., M.Sc., M.D.; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 152, with illustrations. Price: 63s. (English).

"Basic Essentials of Blood Group Theory and Practice", by Kathleen E. Boorman and Barbara E. Dodd; 1961. London: J. & A. Churchill Ltd. 8½" x 5¼", pp. 134. Price: 18s. net (English).

"Annual Review of Biochemistry", edited by J. Murray Luck, F. W. Allen and G. Mackinney; Volume 30, 1961. California: Annual Reviews, Inc. 8½" x 6", pp. 758. Price: \$7.50.

"The Healing of Marriage: A Practical Handbook of Marriage Counselling", by W. L. Carrington, M.D.; 1961. London: The Epworth Press. 8½" x 5¼", pp. 196. Price: 21s. net (English).

"Glaucoma: Chemistry, Mechanisms and Therapy", by Sidney Lerman, M.D., C.M.; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 112 with illustrations. Price: 52s. (English).

"Myxedema", by Jerry K. Aikawa, M.D.; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 106. Price: 40s. (English).

"Cerebral Anoxia and the Electroencephalogram: The Proceedings of the Marseilles Colloquium, sponsored by the Réunion Européenne d'Information Electroencéphalographique, and organized by Professor H. Gastaut and Dr. H. Fischgold", edited by Henri Gastaut, M.D., and John Stirling Meyer, B.S., M.Sc., M.D., C.M.; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9½" x 6½", pp. 618, with illustrations. Price: £6 16s.

"Repeated Blood Transfusion in the Treatment of Bone and Joint Infections", by Loris Figgins, M.B., B.S.; 1961. London, New York: Cambridge University Press; Victoria: Melbourne University Press, in association with Austin Hospital, Heidelberg. 9½" x 6", pp. 90, with figures. Price: 35s.

"Forensic Medicine", by Keith Simpson, M.D. (Lond.); Fourth Edition, 1961. London: Edward Arnold (Publishers) Ltd. 8½" x 5¼", pp. 356, with illustrations. Price: 32s. 6d. (English).

"Abdominal Operations", by Rodney Maingot, F.R.C.S., with Special Articles by 36 British and American Contributors; fourth edition, 1961. London: H. K. Lewis & Co. Ltd. 10" x 6½", pp. 1402, with illustrations. Price: £10 10s. net (English).

"Symptoms and Signs in Clinical Medicine: An Introduction to Medical Diagnosis", by E. Noble Chamberlain, M.D., M.Sc., F.R.C.P.; seventh edition, 1961. Bristol: John Wright & Sons Ltd. 8½" x 5¼", pp. 570, with illustrations, some in colour. Price: 45s. (English).

Ciba Foundation Study Group No. 8, "Problems of Pulmonary Circulation", in honour of Prof. G. Liljestrand; edited by A. V. S. de Reuck, M.Sc., D.I.C., A.R.C.S., and Maeve O'Connor, B.A.; 1961. London: J. & A. Churchill Ltd. 7½" x 4¾", pp. 96, with illustrations. Price: 12s. 6d. net (English).

Medical Department, United States Army, "Preventive Medicine in World War II", Volume V: Communicable Diseases: Transmitted Through Contact or by Unknown Means", prepared and published under the direction of Lieutenant-General Leonard D. Heaton; Editor in Chief, Colonel John Boyd Coates Jr., M.C.; Editor for Preventive Medicine, Ebbe Curtis Hoff, Ph.D., M.D.; Assistant Editor, Phebe M. Hoff, M.A.; 1960. Washington, D.C.: Office of the Surgeon General, Department of the Army. 9½" x 6½", pp. 530, with illustrations. Price: \$5.75.

"Whitby and Hynes' Medical Bacteriology: Including Elementary Mycology and Parasitology", by Martin Hynes, M.D., F.R.C.P.; seventh edition, 1961. London: J. & A. Churchill Ltd. 8" x 5¼", pp. 492, with illustrations. Price: 36s. net.

"Uveitis and Toxoplasmosis", by E. S. Perkins, Ph.D., M.D., F.R.C.S.; 1961. London: J. & A. Churchill Ltd. 8" x 5¼", pp. 142. Price: 30s.

"Hemoglobin and Its Abnormalities", by Vernon M. Ingram, Ph.D.; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 154, with illustrations. Price: 60s.

"Pregnancy and Diabetes Mellitus", by Lars Hagbard, M.D.; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 102, with illustrations. Price: 54s.

"Tools of Biological Research", edited by Hedley J. B. Atkins, D.M., M.Ch., F.R.C.S., Eng., Hon. F.A.C.S., with an introduction by Sir Harold Himsworth, K.C.B., F.R.S.; third series, 1961. Oxford: Blackwell Scientific Publications. 8½" x 5¼", pp. 156, with illustrations. Price: 37s. 6d.

"Chemical Ultrastructure in Living Tissues", by J. B. Finean, D.Sc.; 1961. Springfield, Illinois: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 132, with illustrations. Price: 48s.

"Roentgenology of Intracranial Meningiomas", by Sidney P. Traub, M.D., with introduction by Donald L. McRae; 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9½" x 6½", pp. 238, with illustrations. Price: £5 12s.

"Cancer Chemotherapy", prepared by the Staff of the University of Texas M. D. Anderson Hospital and Tumor Institute Texas Medical Center, Houston, Texas, under the direction of R. Lee Clark, Jr., M.D., D.Sc. (Hon.); 1961. Springfield: Charles C. Thomas; Oxford: Blackwell Scientific Publications. 9" x 6", pp. 254. Price: 84s.

The Medical Journal of Australia

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NATIONAL HEALTH WEEK IN RETROSPECT.

THROUGHOUT Australia, the annual event of Health Week has just been observed. In New South Wales this year marks the fortieth anniversary of this event, the first Health Week having been held in 1921, the result of the joint efforts of Professor Harvey Sutton, who we are glad to report is still with us, and the late Dr. J. S. Purdy, then Metropolitan Medical Officer of Health. The idea of concentrating publicity about health and healthful practices into one week gradually spread to other States, and it has now become a national feature. Five or six years ago an attempt was made to coordinate the efforts of the various States so that the same theme would be used in each State. This year in all States except Victoria, where the emphasis will be on cancer detection and prevention, the theme has been "A Healthy Child, a Healthy Nation".

Anniversaries afford an opportunity to do some stock-taking; and what better one to select than the fortieth anniversary of the first Health Week in Australia? The long-term objective of each organizing executive committee is to bring before the public, and so the appropriate authorities, the needs for the services, buildings and equipment required to improve the health of the community and to present to individuals facts about health with the object of bringing about changes in attitudes and in health practices.

Great changes have occurred in the patterns of disease since the first Health Week was held, and as a consequence in the needs of the individual for guidance and help in achieving optimal health. We have seen a gradual but steady diminution in problems of environmental hygiene and infectious disease control and those due to inadequate diets at all ages. These changes have been matched by the increasing importance of promotion of mental health; the prevention of maladjustment and delinquency; the reduction of accidents in the home, the factory and the street; the need to study the diseases of maturity and the best techniques for the care of the frail and the handicapped.

The health problems of 40 years ago were mainly associated with impersonal or non-human elements, water, food, milk, sewage, housing; even when man was involved as the victim, this was something he "caught" and so he was not considered blameworthy. Facts about safe

water, pure food and adequate disposal of waste and the need for substantial, hygienic, well-ventilated vermin-free homes could be displayed easily and effectively by poster, montage or diorama, in a display hall or by lecture. So far as we are aware, evaluations have never been made to determine the extent, if any, to which displays relating to environmental hygiene and infectious diseases were effective in motivating the individual as was hoped. True it is that over these 40 years there have been vast improvements in the standard of health of the individual; but the credit for much of this must be given either to factors outside the realms of health or to the actions of central authorities. Improvements in the economic status of the community have undoubtedly made substantial contributions to the improvements in nutrition and housing; general education and the mass media, with their addiction to glamorizing and advertising the clothes, diet and toiletries of popular figures, have played a not insignificant rôle in improvements in personal hygiene, diet and dress.

Safe water, milk and food, the adequate disposal of waste and sewage and pest control are largely the outcome of legislation and its effective policing. In this the individual has played an insignificant part; these changes have frequently gone ahead despite him and not because of his efforts.

On the other hand, today's health problems present an entirely different picture; many are intimately concerned with some aspect of the personality of the individual or can be related directly to his behaviour. The list of such problems includes child rearing and its relationship to delinquency and the neuroses; cigarette smoking and the shadow of lung cancer; diet and the threat of cardiac disease; man's personal contribution to the mounting toll of accidents. Certain aspects of these health problems lend themselves to pictorial or graphic presentation in displays or to popular lunch-time lectures, but at the best these can be only an assembly of facts—one of the triad of effective health education. In addition there must be motivation—the individual must want to change his attitude and behaviour; this in turn calls for a bridging mechanism ("interpretation") between the facts and the individual. Since Health Week activities do not seem to provide either of these components, we might be excused for asking what value are the facts alone unless there exist in the community the facilities for interpretation and motivation.

It is this last thought that prompts us to wonder whether the concentration of considerable thought, effort and human energy into one week in the year is the most effective form of health education today. We do not want to belittle the value of Health Week displays, for continuing propaganda about the facts of environmental health is obviously necessary; but there is the danger that those concerned, having staged spectacular, well-attended displays, may be tempted to consider the task over for another twelve months. It can be argued that this form of health education should be a year-long continuous process.

Who shall provide the other two components of the triad, interpretation and motivation? In these columns

we recently¹ drew attention to the rôle of the health visitor in England, where she occupies an important place in the National Health Service, as an auxiliary health worker. Dr. I. A. G. MacQueen, Medical Officer of Health for the City of Aberdeen, recently went on record² with the statement that he would sooner part with one of his senior medical officers than with the superintendent of health visitors, the education officer and the statistician, all of whom possessed professional skills that he lacked. This confession highlights the importance of the auxiliary health worker, who is known by different titles across the world. In England she is the health visitor, and in America, Scandinavia and those countries to which American public health has been exported she is the public health nurse (both of these have had specialized nursing training after completing a basic nursing course); in France she is the *assistante sociale*, whose course of training, in social work, includes a significant amount of nursing experience.

These auxiliary health workers are being used extensively both to bridge the gap between the known facts coming from the health authority and the general public, and to motivate the individual to adjust his attitudes and act in accordance with the newer knowledge. At a conference of European experts on mental health held in Helsinki in 1959, great stress was laid on the importance of the public-health nurse in the promotion of mental health. In other countries she is playing a major rôle in accident prevention. Australia is one of the few advanced countries in the world, if not the only one, that lacks a general-purpose auxiliary health worker who can be used to augment any general health education campaign by working with groups of people who have come to know and respect her. In making this comment we are not overlooking the outstanding contributions made by Baby Health Centre nurses throughout Australia to the health and well-being of mothers and children over the past 40 years. However, it is doubtful whether their training today in some States is sufficiently broad to equip them even for the problems presented to them in their clinics, without considering the wider fields of service provided by the health visitor and the public-health nurse.

In the absence of a general-purpose ancillary health worker, the general practitioner in Australia probably contributes more in the areas of interpretation and motivation than his counterpart in England, America and those countries favoured with an extensive service of public health nurses or health visitors. However, the fields in which the medical practitioner can operate are limited, and it is well recognized that a high percentage of patients are loath to raise with their doctors many topics about which they would like guidance; they fear the questions may be regarded as "too trivial to present to a busy man".

Good as any display may be during a Health Week, its value could be greatly enhanced by adequate follow-up, and we can only regret that the opportunities for this in Australia seem to be inferior to those available in many other countries.

The art and practice of health education of the public in many countries received a great stimulus when health education became a separate administrative section in the World Health Organization in 1949, and with the formation of the International Union for Health Education a year later. In not a few countries the health-education officer has apparently become an important member of the health team, as revealed by Dr. MacQueen's statement referred to above. Health education is concerned largely with changing or modifying health attitudes and practices and so depends heavily on the principles of motivation and learning. These are two areas in which the trained health educator can be most valuable. So far as we know, health education officers with preparation and experience in educational and psychological principles of learning are not employed by any health authority in Australia, and it is highly unlikely that the services of such people are available to aid in the preparation of National Health Week programmes.

Availability of people depends upon positions and training courses. In a number of countries, including England, U.S.A., the Philippines and New Zealand, training courses in health education are available for a wide range of health workers, but as yet no course is available in Australia. Anyone requiring specialized training and experience in this expanding branch of health work is required to go abroad.

We commenced by looking at National Health Week as an educational process, and we have been left with the unhappy thought that this seems to be a poor alternative to long-continuing programmes that are integrated into the general health activities of the community.

Comments and Abstracts.

RADIATION TOLERANCE.

As a great deal is written nowadays about the harmful effects of radiation, it is important to realize that quite high doses of radiation will sometimes be tolerated without apparent ill effect, and that the so-called "lethal dose" is a very arbitrary figure. Two recent case reports provide interesting sidelights on these aspects of radiation exposure. The first concerns a Negro woman who in 1949 received a course of radiotherapy for a carcinoma of the cervix during the seventh month of her eleventh pregnancy. Therapy was by the vaginal application of radium, and deep X-ray therapy from an external source. The child was born prematurely two weeks later, but he was healthy at birth and his subsequent progress was entirely normal. At the age of eleven years he was an alert, clear-eyed boy, physically and mentally normal for his age. A. Ronderos,¹ the author of this report, calculates that the mid-pelvis X-ray dose was 754r in two weeks plus 134r from the radium source. The child's mother is also alive and well, and a recent review of biopsy material taken at the time has confirmed the original diagnosis of squamous-cell carcinoma. Ronderos points out that the dose received by the fetus in this case was larger than that used in a previously reported series of 200 cases, in which radiation was used to procure therapeutic abortion in pregnancies of less than 18 weeks' gestation.

The second case,² reported by E. Donnell Thomas and his colleagues, is one in which an attempt was made to

¹ MED. J. AUSTR., 1961, 1: 131 (January 28).

² Med. Offr., 1961, 106: 5 (July 7).

¹ Radiology, 1961, 76: 454 (March).

² Arch. intern. Med., 1961, 107: 395 (March).

treat a five-months-old infant, suffering from leukaemia, by whole-body irradiation and subsequent infusion of fetal bone marrow. The infant received a mid-line air dose of 1082r, equivalent to a mid-line tissue dose of 864r. This had the expected effect of complete suppression of marrow function. Multiple infusions of fetal haematopoietic tissue and one infusion of adult marrow were given without evidence of a successful marrow transplant. Then on the twenty-ninth day after irradiation polymorphonuclear leucocytes and reticulocytes reappeared in the patient's blood for the first time; this was followed by a rapid return of the peripheral blood count to normal. It was at first thought that a successful transplant of adult marrow had occurred, but further investigation showed that the return to normal was due to recovery of the patient's own marrow. The patient left hospital in complete haematological and clinical remission, but the leukaemia soon recurred, and she died two months later.

Thomas and his colleagues set out in detail the elaborate precautions taken to protect their patient. They state that for most large animals the LD₅₀ dose of irradiation is about 250r, expressed as the mid-line absorbed dose, but they point out that the data on which this figure is based are derived from studies in which the animal received no treatment after irradiation. In their patient, isolation, supportive therapy, antibiotics, and transfusions of platelets and fresh blood prevented death from infection or bleeding in the first month after irradiation, and this allowed time for the regeneration of marrow elements which had escaped destruction. They refer to other irradiated subjects in whom recoveries of autogenous marrow function have been reported in the third, fourth and fifth weeks after irradiation, and conclude that after exposures of 300r to 1000r, administered in one or two days, a regeneration of marrow may be expected provided the patient is kept in good general condition.

ADVERTISING AND SELF-MEDICATION.

PEOPLE are easy marks for quackery and the blandishments of advertisers of medicines and drugs, for they know little about the structure and functioning of their bodies and yet are vitally interested in their own health and like taking drugs. This is one of the main reasons why such advertising should be controlled, according to a survey of health legislation on pharmaceutical advertising published by the World Health Organization¹ which reviews the situation in about 20 countries. The dangers of self-medication are made clear. There is always the risk of choosing the wrong drug, as, for example, an irritant purgative instead of an antispasmodic, of taking an excessive dose or too small a dose, of side-effects or allergic reactions, of interfering with other drugs or of increasing their effect. There is also the possibility that the body will get used to a drug so that it loses its efficiency or becomes a habit, as well as the risk of suppressing the symptoms of an illness that could be cured if treated in time. Another serious objection to pharmaceutical advertising is that it may create a pressing demand for a new remedy, sometimes even before doctors know about its existence, and before adequate tests have been made and the side-effects upon human beings are known.

The medical profession is aware of the dangers, the WHO survey points out. The New York Academy of Medicine has voiced the opinion that the indications given in the advertising of tranquilizers have been "frivolous", the hazards not stressed, and the claims for these remedies advertised in an extravagant and indiscriminate manner, without adequate warning about side effects. Likewise the pharmaceutical profession has raised its voice. The Pharmaceutical Society of Great Britain made some significant assertions in a report to the Ministry of Health in 1947: that pharmaceutical specialities were being advertised to the public with the grossest exaggeration and frequently in a fraudulent fashion; that advertising

of certain medicaments had led to the public's postponing the seeking of skilled advice, thereby frequently prejudicing reasonable success in treatment; that often advertising awoke in the public apprehension and distress regarding the risk of contracting a disease, or regarding the danger of an operation or premature old age or incurable illness; that testimonials as to the efficacy of medicaments lacked serious foundations; that advertising and publicity regarding certain complaints, such as asthma or rheumatism, for example, were frequently exaggerated; that advertising could directly or indirectly undermine the confidence of the public in medical practitioners; that advertisements recommending sexual tonics were especially open to criticism, as was the phraseology utilized in advertising copy, so that despite its apparently scientific nature it was meaningless and designed only to impress credulous and uneducated people; that the composition of certain preparations was often such as to defy analysis; and, finally, that the volume of advertising of proprietary medicines was out of all proportion to their true value to the community.

The survey goes on to state that advertising intended for the medical profession is no less open to question, both its accuracy and volume being frequently criticized by reputable bodies. However, many pharmaceutical houses have maintained high standards in this field, and it now appears to be more generally appreciated that accurate and conservative advertising gains more respect and attention amongst thinking doctors than the flamboyant or shoddy variety. In the overall field of pharmaceutical advertising, the verdict in the WHO survey is that the standard has improved, especially since the war, and particularly thanks to the passing of legislation. Both the International Pharmaceutical Federation and the International Pharmaceutical Industry Group of the countries of the European Economic Community have made efforts to enunciate principles which would protect the public, and the subject is engaging the attention of health authorities generally. In Australia, which is not included in the otherwise quite comprehensive WHO survey,² the National Health and Medical Research Council has the matter under serious consideration and will, we hope, be able to make effective appropriate recommendations in due course.

SHORTER ABSTRACTS.

RADIOLOGY.

DIASEMATOMYELIA. A. S. Bligh, *Clin. Radiol.*, 1961, 12: 158-163 (July).

WITH the increase in clinical awareness of this condition, and because of the value of early operation, radiological recognition of this disorder has become of increasing importance. The important signs in straight films of the spine are: (i) The presence of multiple congenital anomalies such as block vertebra, missing pedicles and neural arch defects; all these findings can exist without diastematomyelia, but this condition should be always borne in mind when such changes are observed. (ii) Widening of the spinal canal; this is displayed by an increase in the interpedicular distances; the important point is that although the interpedicular distances are increased, there is usually no flattening or erosion of the pedicles such as is seen in spinal space-occupying lesions. (iii) The presence of a spur; the radiological demonstration of a bony spur depends on the calcium content of this structure. In the author's cases a spur has been visible only in the antero-posterior projections. Tomography is of undoubted value in demonstrating a spur, but myelography is of the greatest value. It will confirm the presence of a central spur which appears as a negative shadow within the "Myodil" column. It is very important that this spur should be demonstrated by

¹Int. Dig. Hlth Legis., 1961, 12: 1-53.

²Countries covered by the survey are: Argentina, Austria, Brazil, Canada, Colombia, Denmark, Dominican Republic, France, Germany (Federal Republic), Greece, India, Ireland, Italy, Japan, Luxembourg, Peru, Poland, Spain, Switzerland, United Kingdom, United States of America, Yugoslavia.

tilting the patient both head down and then feet down until the opaque medium clears the defect, both above and below. Another value of myelography is that the presence of two meningeal tubes can be demonstrated and this can be of great value to the neurosurgeon at operation. The normal anatomy in these cases is often so disturbed that it is essential to mark the corresponding cutaneous levels on the patient's back at the time of myelography.

PHYSIOLOGICAL CHANGES IN SIZE OF THE HUMAN KIDNEY. C. J. Hodson, *Clin. Radiol.*, 1961, 12: 91-94 (April).

The author noticed a marked temporary shrinkage of volume of the kidneys in patients undergoing aortography and has come to regard it as a normal accompaniment of aortographic procedure in cases of hypertension. Shrinkage of the kidney, estimated as over 40% of its volume in some cases, was observed to take place during "Pentothal" anaesthesia in cases of hypertension. This shrinkage was found exactly to coincide in time with a fall in blood pressure. During the state of shrinkage there may be suppression of urine. Patients with unilateral (ischemic) renal disease show asymmetrical degrees of shrinkage between the two kidneys.

RENAL PAPILLARY NECROSIS. A. F. O'Malley *et alii*, *J. Urol. (Baltimore)*, 1961, 86: 7-11 (July).

The authors state that necrosis of the renal papilla is a serious complication of pyelonephritis and occurs most often in patients with urinary obstruction, diabetes or both. The X-ray findings vary with the stage of the lesion. An early sign is a ragged irregularity of the calyx due to the erosion and ulceration of the necrotic papilla. The "sling" or "ring" sign occurs when the contrast material is visible between the separated renal papilla and the remainder of the pyramid after sequestration. After the elimination of the papilla from the calyx a flask-shaped deformity of the calyx and sometimes a non-opaque filling defect in the renal pelvis may be visualized. Calcification of the separated renal papilla has been reported. Calculi have been reported in papillary necrosis, the core of the calculus being a necrotic papilla. Renal tuberculosis, acute advanced pyelonephritis, tumours of the renal pelvis, ureteral calculus, calyceal diverticulum and medullary sponge kidney must be differentiated from papillary necrosis.

SOME RADIOLOGICAL ASPECTS OF SCURVY IN THE ADULT. N. Joffe, *Brit. J. Radiol.*, 1961, 34: 42-437 (July).

The author describes the radiological changes found in 39 adults in which typical clinical manifestations of scurvy were present. The most constant radiological abnormality was osteoporosis of the spine usually associated with compression fractures of one or more vertebral bodies. The changes observed in the long bones of the limbs consisted essentially of osteoporosis and/or periosteal new bone apposition. In the joints the changes observed consisted essentially in a slight increase in the joint space, a blurring or haziness of detail of the bones forming the joint and a diminution or obliteration of the normal landmarks of the periarticular fatty tissues. In severe cases more advanced changes occurred. The presence of large muscle haemorrhages or superficial hematomas was observed rarely, as one or more soft tissue masses with compression or obliteration of the intramuscular fatty tissue planes. Dental caries was frequently observed, but the lamina dura of the teeth usually remained intact. The presence of a heavily blood-stained pleural effusion was noted in two cases and in one case a blood-stained pericardial effusion developed. Although the investigation failed to reveal radiological changes specific to scurvy in the adult, it did demonstrate that a variety of changes may occur. This is in contrast to the generally expressed view, that radiological abnormalities are not, as a rule, observed in the adult.

HODGKIN'S DISEASE IN BONE. I. S. Fucilla and A. Hamann, *Radiology*, 1961, 77: 53-60 (July).

The authors state that the reported incidence of Hodgkin's disease in bone varies widely with the diagnostic criteria. A distinction must be made between medullary and cortical lesions. In the spongiosa the disease may be widespread without giving rise to symptoms or radiographic signs. Hodgkin's disease in cortical bone usually gives some indication of its presence, although large lesions are often

found which have produced no signs or symptoms. The most common manifestation is localized pain. This may be intermittent or persistent and may occur in any phase of the disease. The most common sites of radiographically apparent lesions are the pelvis, particularly near the sacro-iliac joints, the vertebral bodies, the sternum, the proximal halves of the clavicles, and the femurs. Hodgkin's disease in bone is predominantly osteolytic, with areas of osteosclerosis confined to the margins of smaller lesions or interspersed within the larger ones. Next in frequency, but considerably less common, is the pure osteolytic type. The destruction is often accompanied by expansion, particularly when involving the ribs or sternum. Pure osteoblastic involvement is rare and usually is seen only in the vertebral bodies. Periosteal new bone formation is not common and, when it does occur, is minimal. Some spicule formation occasionally may be found, producing an appearance similar to osteogenic sarcoma. Multiple lesions are the rule, and any or all of the types of involvement described above may be found in one patient. Radiographically, the maximum incidence of bone involvement is in the upper lumbar and lower cervical segments of the spine, corresponding to the prevertebral nodal areas. The earliest sign is a minimal increase or decrease in the density of the entire bone. Most lesions of the vertebrae occur in the bodies and are of a mixed type. Collapse of the body occasionally occurs, but this is less frequent than with metastatic carcinoma or lymphosarcoma. A marked deformity seldom results because the intervertebral discs are characteristically spared. When sclerotic changes occur they are usually in the vertebral bodies. Involvement of the skull, ribs and sternum is primarily of an osteolytic type. In the pelvis the disease is usually found in the wings of the ilia adjacent to the sacro-iliac joints. Here the process is of the mixed type giving rise to a "soap bubble" appearance. Occasionally a combination of osteolytic and osteoblastic reactions with periosteal new bone formation will mimic Paget's osteitis deformans.

PNEUMATOSIS INTESTINALIS. W. S. Keyting *et alii*, *Radiology*, 1961, 76: 733-741 (May).

The authors contend that the concept of primary and secondary aetiology of pneumatosis intestinalis should be abandoned, and that all cases fall into the secondary group. In other words, a cause can be established if a cause is sought, and the pneumatosis is invariably secondary to other conditions. It is proposed that the mechanical theory of production of pneumatosis intestinalis will explain all cases, and that three major mechanisms are responsible: (i) obstruction, which implies perforation secondary to duodenal or pyloric ulcer, volvulus, tumour, and less frequently occurring conditions; (ii) trauma, resulting from sigmoidoscopy, and/or biopsy, pneumoperitoneum, and pre-sacral air studies; (iii) development secondary to pulmonary disease with severe cough, resulting in pneumomediastinal and air dissection downward, retroperitoneally, and then along a vascular route to the bowel wall. The disease manifests itself variously as (a) large cystic accumulations of air displacing the bowel lumen, (b) air distributed in a linear fashion along the visceral wall, without significant displacement of the bowel lumen, or (c) a mesenteric distribution of air. The authors consider that these three manifestations are all part and parcel of the same process, that the manner in which the disease presents is but a matter of degree of pressure gradient acting through a variable length of time, and that this may probably be modified by bowel activity and strength of fascial planes. Several additional cases of pneumatosis intestinalis are submitted, and the conclusion is reached that most, if not all, cases of so-called "primary pneumatosis" can be explained on the basis of pulmonary disease associated with harsh cough, alveolar rupture, pneumomediastinum, and retroperitoneal air advancing along vascular routes to the wall of the bowel.

THE OCCIPITO-ATLANTO-AXIAL JOINTS IN RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS. W. Martel, *Amer. J. Roentgenol.*, 1961, 86: 223-240 (August).

The author states that the cervical part of the spine is frequently affected in classical rheumatoid arthritis as well as in ankylosing spondylitis. Subluxations, especially atlanto-axial, often accompany such involvement, but flexion views are generally required for the diagnosis. Pathological laxity of the transverse ligament may account for minimal degrees of atlanto-odontoid separation. When this separation is

severe, however, one may postulate rupture of this ligament: in such cases, the extent of forward dislocation of the atlas and skull is apparently variable and depends largely on the functional length of the alar ligaments. Minimal widening of the atlanto-odontoid space in flexion, in the presence of odontoid erosion, does not necessarily signify an abnormality of the transverse ligament. The reduced diameter of the odontoid process due to erosion may cause it to fit loosely in the ring formed by the anterior atlas and transverse ligament, and may alone account for atlanto-odontoid instability. Cervical subluxation is less prevalent in ankylosing spondylitis, but many patients have advanced bony fusion of the posterior articulations and extensive paraspinal ossifications. Such subluxations may occur more frequently during the active phase of this disease. It is possible, too, that neck pain is a less reliable indication of cervical subluxation in ankylosing spondylitis than in rheumatoid arthritis. The occurrence of erosions of the odontoid process in these diseases is not surprising. In rheumatoid arthritis such lesions, as well as those in adjacent ligaments, are apparently identical to those in the peripheral joints. The lower cervical spinous processes either show sharply margined cortical erosions or, more often, their previously rounded ends become pointed, frequently appearing as though they have been amputated. The surface erosions of the odontoid process in ankylosing spondylitis appear superficial and are usually associated with a reactive sclerosis, obliterating the normal trabecular pattern. Such erosions with adjacent osteosclerosis have been described in the pelvic bones and vertebral bodies in this disease, usually at points of ligamentous attachment, and presumably represent the same pathological process as in the odontoid process. Basilar invagination may occur as a complication of rheumatoid arthritis, but in some cases the features are atypical and might more properly be called "pseudo-basilar invagination". These lesions of the cervical part of the spine are potentially dangerous and often overlooked.

RADIOTHERAPY.

TREATMENT OF HEAD AND NECK CANCER. W. S. MacComb, *Amer. J. Roentgenol.*, 1960, 84: 589-609 (October).

IN the Janeway Lecture for 1960, after an historical account of the treatment of head and neck cancer, the author reviews the past eight years' experience at the M. D. Anderson Hospital in Texas. This study concerns 416 cases. The choice of treatment depends upon the site and the extent of the disease at the time the patient is first seen. In general, patients with lymphomas are treated by radiation; those with salivary gland tumours and tumours of the thyroid are treated surgically; sarcomas are comparatively rare in the head and neck region and are mainly a surgical problem (this, of course, does not include the lymphosarcomas, which are also irradiated); squamous-cell carcinomas have made up the largest percentage of this group of malignant tumours and frequently both surgery and radiation therapy are needed. For most of the intraoral squamous-cell carcinomas irradiation is thought to be the treatment of choice. Various combinations of external radiotherapy and interstitial radium implantation are utilized in the management of these tumours. Most are quite radiosensitive. Cancers arising in the oropharynx and the pharynx are usually treated by radiotherapy, and local metastases, when present, are included in the treatment field of the primary lesion, if this is possible. If the regression of the tumour is not complete or there are other signs of activity, then a surgical attack is instituted. Early carcinoma of the intrinsic larynx in the author's experience seems best managed by external radiation. Early tumours of the supraglottic region may be successfully treated by irradiation, but when invasion of cartilage is well established, response is not usually favourable. Tumours of the larynx which have undergone radical radiotherapy may still be treated by total laryngectomy without fear of increasing the morbidity of the surgical procedure.

Tumours best treated primarily by surgery include many tumours of the skin and occasionally very early lesions in the oral cavity in readily accessible regions. Carcinomas of the hard palate and upper alveolus are considered to be entirely surgical problems, as are many tumours of the supraglottic region of the extrinsic larynx. For malignant disease of the cervical part of the oesophagus surgical excision is preferred.

In many instances the combined use of radiotherapy and surgical excision offers the best chances of control. This planned therapy is particularly useful in patients with cervical lymph node metastases from intraoral cancer. There are a number of these lesions which have been ordinarily successfully treated by either radiotherapy or surgery but in which recurrence or reactivation of the primary lesion necessitates further therapy. In general, recurrence following initial radiotherapy is managed by surgery and vice versa.

RADIATION THERAPY AND THE MANAGEMENT OF NEOPLASMS OF THE CENTRAL NERVOUS SYSTEM. J. Bouchard and C. B. Peirce, *Amer. J. Roentgenol.*, 1960, 80: 610-628 (October).

THE authors present the result of 20 years' experience at the Royal Victoria Hospital, Montreal, with irradiation of neoplasms of the central nervous system. Their findings are based on a total series of 826 patients, including 534 who were adequately treated from five to 20 years ago. The patients regarded as adequately treated had received a tumour dose which was considered potentially capable of controlling the neoplastic process, possibly with a curative effect; for the most part this meant a dose of 5000 to 6000 r in approximately 50 days.

Between 1939 and 1953 399 patients with primary intracranial tumours were seen. Of these, 22% were still living five to 20 years after irradiation; 32% survived for five years or more after diagnosis and treatment. The majority (88%) were treated post-operatively, chiefly because of presumed incomplete removal of the tumour; the remaining 12% were treated by radiation alone without any attempted surgical removal. Of these 399 tumours, 78% were classified as gliomas. Glioblastoma multiforme has the poorest prognosis of all the malignant gliomas; of 125 patients only 20% lived more than two years; only four were still alive seven, nine, 11 and 14 years after diagnosis. The authors believe that for glioblastomas the combination of irradiation with surgery offers a definite advantage. The ten-year survival rate in 81 patients with astrocytoma was 36%. Comparison of these results with those in surgically treated series shows that the patients treated by surgery and irradiation may expect a much greater survival. In this series 30 tumours were regarded as unclassified gliomas and these responded slightly less well than the astrocytomas, with six patients living over ten years. In medulloblastoma the three-year survival rate was only 29%. Forty-one patients were seen, and only five of these had involvement of the spinal axis. The authors point out that the survival rate in this condition appears rather more favourable, but is markedly less than reported by other centres. Twelve cases of ependymoma and ependymoblastoma were seen; the ten-year survival rate was 50%. Oligodendroglioma and oligodendroglioblastoma are even more uncommon types of glioma; only nine cases were seen, and these were irradiated because of their more malignant character and incomplete surgical removal. Five of these patients survived over five years, but only one had lived for more than ten years at the time of the report.

Mid-brain and pontine tumours are infrequently accessible for biopsy, and in only seven of the 20 tumours in the mid-brain in this series was the histological type of neoplasm known. The over-all five-year survival rate for these patients was 40% with irradiation alone. There were 21 pontine tumours, for only one of which was the histological diagnosis available; four of these patients had survived 10 years after irradiation.

There were 16 patients with malignant meningiomas, of whom 9% survived ten years or longer after treatment with surgery and irradiation. Fourteen blood-vessel tumours were seen of various histological types. In this group only four patients died and most of them have been able to resume useful lives. Twenty-seven patients with metastatic tumours to the brain were seen and irradiated, only seven of these showed no improvement after such treatment; 17 of them became clinically normal for varying periods of time.

A special section is devoted to the 79 children under 15 years of age who were included in this series. Medulloblastomas accounted for 28 of this group. Twenty-five of the children were still living five to 20 years after irradiation. Of those children who survived for long periods, not one has shown any signs of post-irradiation damage to the pituitary gland, and there have been no disturbances of normal growth and development. Direct comparison of five, 10 and 15 years' survival rates indicates that children, in general, can be expected to do as well as, and probably better than, adults in terms of long and useful survival.

Points of View.

WHY AREN'T CLINICAL MEETINGS MORE POPULAR?

"THAT concludes tonight's clinical evening, ladies and gentlemen. Supper will be served in the residents' dining room." That this announcement is sometimes the most welcome part of a clinical meeting is unfortunately a reflection on the meeting rather than a tribute to the supper.

Are clinical meetings dull? Often they are. More often they are a mixture of interest and boredom. In this article the aim will be to indicate the commoner dull spots, and to suggest how these potentially valuable gatherings might be made more attractive.

There are two common types of clinical meetings. One comprises a series of consecutive case presentations before a seated audience. In the other type, usually held in the out-patient department, there is a number of simultaneous exhibits, and the audience is free to wander from one to the other. Our remarks apply particularly to the first kind of meeting, conducted in a general hospital for an audience of resident medical officers, general practitioners and specialists. The successful meeting is the one which is planned from two points of view: (i) the duration of the meeting and of its several presentations; (ii) the nature of the cases and the way they are presented.

A clinical meeting is usually an addition to an already full day. In these circumstances, a meeting of one and a half hours' duration is long enough. The aim should be to leave the audience wanting a little more rather than a little less. There is no ideal kind of programme, nor is a fixed pattern desirable; but one satisfactory arrangement is to allot one quarter of an hour to each case. Of this time, approximately one half should be used for presentation of the case and one half for discussion. On this basis six cases could be dealt with—and if the audience is not to be given an overdose of clinical matter in one sitting, this number is ample.

Nature of Presentations.

The case must be presented with a definite purpose, and at such a level as to be understood by, and informative to, the rather mixed medical audience. This seems all too obvious, yet equally obviously it is often neglected. We recently heard an excellently prepared "paper" on buphthalmos. The speaker knew his subject, defined his terms accurately, quoted appropriately from the literature and produced a patient by way of illustration. But to 45 of the 50 doctors in the audience the presentation was a failure. Why? Because the barrage of technical terms on a rare disease was away beyond the grasp of all except the speaker himself and the few ophthalmologists present. At an ophthalmic meeting this presentation would have been 100% successful. As it was, it was 90% unsuccessful. This is not to say that buphthalmos is an unsuitable subject for a general clinical meeting—quite the contrary; but on this occasion it should have been presented from the viewpoint of the average member of the audience. This average member is not interested in theories regarding the causes of rare eye diseases. He has long since forgotten what and where Descemet's membrane is. He is only dimly aware of the formation, circulation and drainage of aqueous humour, and he is more than a little uncertain of the whereabouts of the anterior and posterior chambers. What he is interested in, is the existence of glaucoma in babies, in the fact that the patient often presents as a photophobic infant with eyes "as big as saucers" and with opacities in the corneas, and that, if operation is not prompt, blindness usually ensues.

Another "must" which is very often neglected, is a statement at the outset as to why the case is being presented—for example: "this case of pneumonia is being discussed because of its unusual presenting signs . . ."; "this case is being discussed because it illustrates a danger in the treatment of . . .". Many a presentation

concludes with the audience still wondering why it was included in the programme, and with a suspicion that the doctor presenting it was not clear in his own mind as to what he was trying to demonstrate.

The limitation to seven or eight minutes suggested as a suitable maximum for presentation forbids circumlocution. In any case, the audience is not interested in details if these are irrelevant or negative. Why enumerate the details of a differential white blood cell count if the essentials of the information can be conveyed in the words "the white cell count was normal"?

It is well worth while to conclude the presentation with a summary of the salient features, and this can usually be done in half a minute. This repetition brings the inattentive listener (and aren't we all at times?) back into the picture, and is a useful refresher for everyone. It saves time, too, by avoiding subsequent questions about essential points which some in the audience missed at the first mention.

The Patient and Other Exhibits.

When should the patient be presented in person?

Time 9 p.m.; Dr. Jones has just described the case of Johnny Smith.

Dr. Jones: "... and now, I'd like you to see Johnny for yourselves—yes, come in Mrs. Smith."

(Enter Mrs. Smith with a very drowsy three-year-old.)

Dr. Jones: "The doctors are very interested in Johnny's case. How are you Johnny?"

(Johnny, prodded into reluctant wakefulness, mumbles something unintelligible to all except his mother.)

Dr. Jones: "Aha, overcome by the occasion eh? Tell me, Mrs. Smith, how is he since leaving hospital?"

Mrs. Smith: "Oh, wonderful, thank you, Doctor. He's a new boy."

Dr. Jones: "No more pain or vomiting?"

Mrs. Smith: "Definitely not. You'd never know he'd been so sick."

Dr. Jones: "Good, good, that's lovely. Has anyone any questions for Mrs. Smith? No? Oh well, thank you ever so much for coming."

It speaks volumes for the traditional doctor-patient relationship (plus the compliment of being presented to "The Doctors' Meeting") that we have never heard a murmur of dissatisfaction from a patient in these circumstances. It behoves us to see that there is not a first time. There are so many obvious reasons for not fetching the patient from his home, or even from the ward, that we should be sure in our own minds of our purpose if we do so. The questions to be answered are: What are we trying to show by having the patient attend? Will this point, in fact, be effectively demonstrated by his attendance? Is there another way of illustrating it which is as good, or practically as good? Whilst there is a certain human-interest value in the presence of the actual patient, many features are far better demonstrated, especially to more than a few people, by a good colour slide. A projected colour transparency of a rash is infinitely preferable to the patient himself without it.

Another example can be cited in the case of a man, aged 75 years, who was presented at a clinical meeting as a demonstration of carcinoma of the back of the tongue. The only effective view of the lesion was available to those with the perseverance to follow the queue, don the proffered headlight and wield the tongue depressor. For a meeting of more than half a dozen, this lesion could have been better shown photographically—and with far less discomfort to the patient.

If the patient is present, he should, like any important exhibit, be adequately illuminated. Many a clinical feature has wasted its interest in the gloom for the want of so simple an accessory as a torch. The same need for

good illumination applies to all exhibits, whether pathological specimens or illustrations on the blackboard. Incidentally, the speaker himself will command more attention if he stands in a good light.

Demonstration of radiographs is usually a problem. It is more than likely that even the front row of the audience will not be able to see sufficient detail in a radiograph on a viewing box several feet away, often on an angle and with a glare of white light around it. The speaker should decide beforehand whether the radiograph is essential to the presentation. If it is not, he should omit it. If it is essential, then the audience should be enabled to see it, and for this a projection slide is essential.

Graphs and summaries in the form of large posters or slides can be a great asset to a presentation, but if unwisely used can be (and, alas, often are) a liability. Slides generally err on the side of being overloaded with data and therefore confuse instead of clarifying. In general, a slide requires some commentary by the speaker. However familiar the information may be to the lecturer, he should never assume that it is obvious to the audience. It is therefore a good rule for the speaker to read every word aloud. This practice would eliminate the annoyance which results from a slide being switched off while frustrated members of the audience are only half-way through reading it. Indeed, to give an audience this treatment is really an act of rudeness on the speaker's part, equivalent to offering one's guest a book to read and then snatching it from his hand while he reads!

Figure I represents a slide used to guide the audience

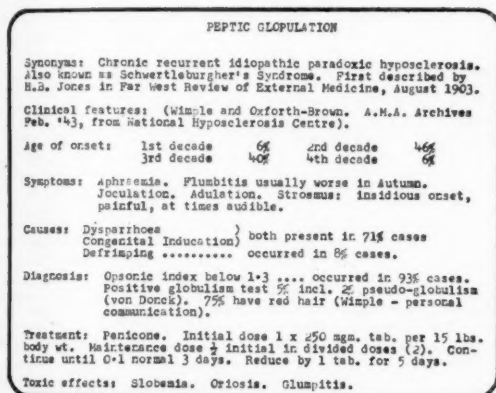


FIGURE I.

A poorly-designed slide. Overcrowding and inclusion of unessential detail ensure lack of audience appreciation.

through a dissertation on a certain disease (in this case a fictitious one). This slide is confusing, because it shows too many data at once; also it makes impossible demands on the audience's visual acuity. Note the improvement if the essentials are lifted out and subdivided to make a series of slides—Figures II and III represent examples. The details will be added verbally by the speaker.

But well-prepared slides (and slide-making is a specialty in itself) must be well projected. The projector should deliver adequate light. The screen must be of suitable size and correctly positioned. Setting up and testing of screen and projector must be done before the meeting is timed to begin. A wise speaker goes through his material with the projectionist beforehand.

When Attention Wanders.

Since meetings are usually held at the end of a busy day, it can be expected that some among the audience will be sleepy. Their attention is very apt to wander. It is

therefore common sense to eliminate any avoidable distractions, such as the noisy fan (change it for a quiet one), traffic in the corridor (close the door), or the turbulent telephone (have it muffled or, better still, have it installed elsewhere). If air-conditioning is in operation, have someone whose duty it is to make adjustments as indicated by changes in room temperature and audience numbers, as the evening progresses.

PEPTIC GLOPULATION

3 CAUSES

- | | |
|-------------------------|----------|
| 1. DYS-PARRHOEA | } COMMON |
| 2. CONGENITAL INDUCTION | |
| 3. DEFRIMPING | RARE |

FIGURE II.

Essential information is divided to make a series of concise, coherent slides. Clarity is achieved. The audience can read and retain.

Blackboard illustrations concerning a previous or subsequent case should not be left on display to compete for attention with the speaker. A most annoying distraction is a light shining directly into the eyes of the audience—for example, an X-ray viewing box left switched on. Again, it would seem worth while to appoint someone to attend to such matters.

1ST COMMON CAUSE OF PEPTIC GLOPULATION

DYS-PARRHOEA

SUSPECT IF RED HAIR

TREAT WITH PENICONE

FIGURE III.

See legend to Figure II.

Chairmanship.

However carefully the meeting is planned, it is the chairman who can make or mar the show. His is the all-important task of "keeping the ball rolling", keeping the case presentations to time and keeping the discussions "on the rails". Often he can paraphrase a question from the audience so as to make it more audible and intelligible. He should repeat, for all to hear, questions and answers, which often pass in conversational fashion between the member in the front of the room (with his back to most

of the audience) and the speaker or the patient. Not the least important of the chairman's duties is to open the meeting punctually at the announced time. Whilst he may and should scatter a pearl or two by way of comment, such contributions should be minimal. Above all, the chairman must resist the temptation to turn his incidental comment into a case presentation of his own.

And finally, after an hour and a half of fascinating medical material, run to time, and to the audience's aural, visual and physical comfort, the chairman's popularity is assured when he announces: "That concludes tonight's clinical evening, ladies and gentlemen. Supper will be served in the residents' dining-room."

F. S. OWEN,
M. D. OWEN,

The Royal Newcastle Hospital,
Newcastle.

PAPER PRODUCTS AND HOSPITAL HYGIENE.

EVER since the acceptance by the medical profession of the work of Pasteur, it has been realized that a major problem in hospital management is the prevention of cross-infection of patients by hospital equipment. The normal preventive measures are heat sterilization in an autoclave, normal washing and laundering processes or application of a germicide. However, none of these methods is foolproof, and as such tasks are normally carried out by unsupervised junior nursing staff or by unskilled general labour, it is inevitable that some contaminated equipment will be released for re-use in the hospital. Tests carried out by hospital personnel have shown that such a situation does in fact exist, and that steps should be taken as rapidly as possible to remedy it. The most reliable method of preventing cross-contamination would be the introduction of disposable equipment to be discarded and burnt after a single use, a procedure which eliminates the possibility of such equipment acting as a source of infection on re-use. Some steps have been taken in this direction in overseas hospitals in recent years, but it is certain that many as yet unexplored fields could be opened up.

Apart from improvements in hospital hygiene, the use of disposable materials has other advantages. In some cases at least, the cost of using disposable materials would be much less than the capital cost plus sterilization, laundering or other maintenance on permanent equipment. For example, the cost of laundering a cotton drawsheet measuring 6 ft. by 3 ft. is approximately one shilling, or three times the cost of an equivalent area of paper towelling. Thus, even if the cost of a paper suitable for acting in place of a drawsheet was three times that of regular paper towelling, the original cost of the drawsheet would be saved. Furthermore, if the paper was backed with a moisture-proof coating (for example, polythene), the use of rubber mackintoshes could be eliminated with a further saving in cost. Other advantages would include reduced handling of contaminated material by nursing staff, greater ease of disposal of soiled equipment and greater standardization of nursing practices, as differences in the handling of different types of patient were reduced to a minimum.

There are several different uses to which disposable materials might be put. For example, some bed linen could be made of disposable materials, particularly when the linen is likely to become badly soiled or contaminated. Disposable clothing is already available overseas, and this would be particularly suitable for use in operating theatres, as it could be supplied in a pre-sterilized pack to be opened immediately before use. Some items of hardware could also be replaced by disposables. Such things as sputum cups, some types of urinals, kidney dishes and waste bins, to name but a few which rank high as carriers of infection, could all be replaced by properly designed disposable containers.

With the wide range of properties which can be imparted to paper, it must be considered as the preferable material for the manufacture of disposable articles. It can be made suitable for uses requiring absorbency or water-proofness, flexibility or rigidity, while retaining the advantages of cheapness and suitability for disposal in an incinerator. (If this means of disposal is prohibited by local by-laws, it should be possible to use such material as a boiler fuel if appropriate handling precautions were taken.) In addition, it can be impregnated with a germicide if so desired.

The present need for disposable articles suitable for hospital use could undoubtedly be satisfied by mutual cooperation between the parties concerned—paper manufacturers and converters and members of the medical and nursing professions.

A. W. MCKENZIE,
Experimental Officer, Division of
Forest Products, Commonwealth
Scientific and Industrial Research
Organization.

Out of the Past.

MELBOURNE HOSPITAL.¹

[From the *Australasian Medical Gazette*, August 20, 1903.]

THE 56th Annual Meeting of the Melbourne Hospital Governors was held on July 22nd. The Chairman regretted that the exigencies of the times had produced a debit balance of £4073 2s. 5d. The committee had intended meeting the deficit either by closing some of the wards or by handing the institution over to the Government. The overdraft had been produced by the economy of the Government in cutting down the grant by £2000 in 1893-94, and since had further reduced the grant by £2160. The committee felt that the closing of the wards would be a calamity, and had determined to go on with the work and not do so. The pressure on the hospital had been intensified by the delay in opening the Infectious Diseases Hospital. The committee of the Melbourne Hospital had resolved to remove the fever tents. It was suggested that a charity tax should be imposed; one of 2d. a head would bring in an income of £150,000 per annum. Also, a tax on sports. The racing clubs did not contribute to the hospitals, though accidents happening at such meetings were treated at the institutions. The maintenance of the hospital was shown to cost £7147 19s. 2d., which was less by £171 than last year, the surgery and dispensing £269, the salaries and wages £146 less than last year. The total ordinary expenditure of the year amounted to £26,194 12s. 1d., a saving of £1101 on the figures for the preceding 12 months. The ordinary income of £21,570 13s. 4d. had gone back slightly. A resolution was carried to the effect that the Committee should approach the Government and ask it to bring in legislation imposing a tax on municipalities and another on pleasures, for the purpose of assisting the charities of Victoria.

Obituary.

NORMAN LAIDMAN DODD.

We are indebted to Dr. J. P. MAJOR for the following account of the career of the late Dr. Norman Dodd.

The many friends and colleagues of Dr. Norman Dodd learned with much regret of his death on June 22, 1961.

Norman Laidman Dodd was born in the Melbourne suburb of Kew on November 29, 1902. He was educated at University High School and later at Wesley College. At Wesley he played a leading part in all the school activities, becoming a prefect, captain of cricket and a member of the football team, and crowning his school career by being awarded the Alexander Wawn Scholarship. It is appropriate to

¹ From the original in the Mitchell Library, Sydney.

state that the award of this scholarship is based on the possession of the three following attributes: literary and scholastic attainments; force of character, influence for good in the school and qualities of leadership; and, thirdly, fondness for and excellence in manly outdoor sport.

From school he entered the University of Melbourne as a medical student, was awarded a half blue for football and, despite a long period of ill health, graduated M.B., B.S. in 1927. After this he was appointed a resident medical officer in the Melbourne Hospital, and later held resident appointments at the Children's Hospital, the Eye and Ear Hospital and the Women's Hospital, thus gaining a wide general knowledge and experience which must have stood him in good stead when he sat for and obtained his M.D. degree in 1931. The next year he entered into partnership with the late Dr. George Guthridge in Footscray; from this arose the Footscray Clinic in 1936, of which he remained the senior member till his death.

At the inaugural meeting of The Royal Australasian College of Physicians he was elected a member, and then he went to London and gained the Diploma of Obstetrics of the Royal College of Obstetricians and Gynaecologists. On his return he resumed practice, and when the Footscray and District Hospital came into being in 1953, he was elected its senior honorary physician.

During his university course he joined the Melbourne University Rifles and later became medical officer to the 6th Heavy Brigade. At the outbreak of war he was posted to Balcombe Camp with the rank of major, but to his regret a medical board decided in 1941 that he was unfit for military service. In fact throughout his professional career Norman never enjoyed persisting good health, and during the last year or so it was for him almost a constant fight against serious ill health. From 1954 he was a member of the Council of the Victorian Branch of the British Medical Association as representative of the Western Suburban subdivision. He was a valuable member of the Council and, as well, served very ably on the hospital, organization, workers' compensation and scale of fees subcommittees.

Despite these activities and the exigencies of an extensive practice, he had other interests, being *inter alia* an Honorary Life Member of the St. John Ambulance Association for services rendered, and he was also a foundation member of the Footscray Rotary Club. His interest in sport, too, was always maintained as evidenced by his membership of the Melbourne Cricket Club, the Victorian Racing Club, the Victorian Amateur Turf Club and the Lawn Tennis Association of Victoria.

Norman Dodd was a man of sterling character, always sincere, courteous and considerate; he had high ideals of honour and honesty of purpose, and his friendship was something of very much value. The large attendance at his funeral service in St. John's Church of England, Toorak, was further evidence of the widespread regard and esteem in which he was held. To his wife, Nell, and their two married daughters our deepest sympathy is extended.

KEVIN JOHN O'DAY.

We are indebted to Dr. EDWARD RYAN for the following account of the career of the late Dr. Kevin O'Day.

Dr. Kevin O'Day, one of Australia's best known ophthalmologists, died at Mt. St. Evin's Private Hospital on June 6, 1961. He was 61 years of age, and had not long retired from St. Vincent's Hospital, Melbourne, where he had been the ophthalmic surgeon since 1937.

Kevin O'Day was born at Ballarat, the son of the late Patrick and Kathleen O'Day. He went to school first at St. Patrick's Christian Brothers' College, Ballarat, and later at Xavier College, Kew. He studied medicine at the University of Melbourne where he was a resident at Newman College. In 1923 he graduated with honours in all subjects and later proceeded to take his doctorate of medicine in diseases of children at the University of Melbourne. After a short spell in private practice, he decided to make ophthalmology his life's work, and proceeded to London, where he studied his speciality at Moorfields Eye Hospital. After visiting the great centres of ophthalmology in Paris and Vienna, he spent some time in Jerusalem as registrar of St. John's Eye Hospital.

Returning to Melbourne he started practice at 33 Collins Street, and it was not long before he became recognized as one of the most promising and original recruits to

Australian ophthalmology. This was the time of the financial depression, and for most young men patients came all too slowly. However, O'Day was not idle, and set off to investigate the eyes of native Australian fauna. In this he received great encouragement from the late Sir James Barrett, who was quick to recognize originality and enthusiasm in that section of natural history which had always interested him. O'Day became an accomplished pathologist and histologist. From all over the country came specimens, ranging from the eyes of the gecko to those of the flying fox, while oculists in other States sought his opinion on specimens of human pathology. He presented the results of his studies in comparative anatomy as a thesis, and for this he was awarded a Fellowship of the Royal Australasian College of Surgeons. He maintained his interest in histology, and as the years went by amassed a magnificent collection of specimens which attracted visitors from other States and from students of his speciality.

Honours came his way. For ten years he was an examiner in ophthalmology for the Royal Australasian College of Surgeons, and for five years he was chairman of the Board of Studies for the Faculty of Medicine in ophthalmology. He was president of the Victorian Section of the Ophthalmological Society of Australia (B.M.A.) and in 1958 was



federal president of the Society and host to the annual meeting in Melbourne. He will long be remembered for his leadership and for his courtesy at this 1958 meeting, where he welcomed many fellow ophthalmologists from all States and overseas.

From all this it will be seen that O'Day died at the height of his powers. As a consultant he was in great demand, for his advice was clear and logical, and both doctor and patient felt they had received the best counsel possible and the most kindly consideration. His early training at Moorfields and at St. John's Hospital left a stamp upon his surgery which was conservative and sound. His interest in plastic surgery of the eyelids sprang from his experiences with trachoma in the Middle East. One of his first contributions to *The Australian and New Zealand Journal of Surgery* was an article on "Relief of Trichiasis and Cicatricial Entropion". Like all sound operators, once he was convinced of the value of a new method he lost no time in perfecting the new technique. I believe that he was the first to perform the lamellar corneal graft in his home city, and a few weeks before his death he was seen to complete a dextrous cataract section using a modification of Scheie's method.

As a teacher he was original, logical and uncompromising, never caught up by the prevailing fashions of medicine and surgery. He subjected each notion to a searching examination before allowing his students to adopt it. He was patient with his house surgeons and a loyal champion in their successes and failures. Those who were examined by him at the Royal Australasian College of Surgeons always paid tribute to his absolute fairness; but it must be added that he once remarked that he feared he could never become a really good examiner as the candidates seemed daunted by his "naturally sombre expression". This may have been so; but behind a stern façade one could discern kindness and consideration that encouraged many a flagging candidate.

Perhaps it will be for his work in comparative anatomy that he will be remembered longest. This was original and won him friends all through the scientific world. Professor Weve of Utrecht, after seeing O'Day's collection of com-

parative anatomy slides, declared that this alone had made worthwhile a journey around half the globe. O'Day was a pioneer of the hot celloidin technique of preparing histological specimens, and his advice on this method was sought and followed from Singapore to London.

He was an indefatigable correspondent of scientific journals; his bibliography lists no less than 29 original contributions. His publications ranged from observations on optics to the eyes of Australian marsupials. His letters appeared regularly for many years in the *British Medical Journal* and *THE MEDICAL JOURNAL OF AUSTRALIA*. The last was a delightful annotation of Charles Dickens and modern methods of resuscitation.

As a speaker at scientific meetings O'Day was listened to with respect, but by no means with unqualified approval, for he was fearless and uncompromising in denouncing any idea that he felt was false or pretentious. It was this honesty and inability to tolerate loose thinking that often aroused resentment; but as the years went by, it became clear that it was not personal bias that prompted his criticism, but rather a love of truth founded on character and clear scientific thinking. His loyalty to his colleagues in the face of attacks from outside their ranks was exemplary. Perhaps it was his own essentially humble nature that helped him to understand that even the best of us make mistakes.

His life was directed and illuminated by his Roman Catholic faith, and perhaps it was shown best by his charity and kindness to the public-hospital patients of his beloved St. Vincent's Hospital. He was heard once to say that for 25 years he had never missed an early morning visit to the wards.

O'Day leaves a widow, three daughters and a son, Denis, whose graduation in medicine last year brought him deep satisfaction. His many friends in Australia and throughout the ophthalmological world abroad will want to extend their sympathy to his family and assure them that his memory will remain and be cherished.

MR. F. J. COLAHAN writes: Dr. K. O'Day was appointed ophthalmologist to St. Vincent's Hospital in 1937, and held this appointment till his retirement in 1961, when he became consultant ophthalmologist. During this service he worked persistently to develop the department, and by demonstrations and discussions at clinical meetings, as well as by frequent ward consultations, the eye clinic, from being rather a "hospital orphan", became an important place to visit in the hospital.

O'Day's keen interest in and knowledge of technical matters in other branches of medicine as well as ophthalmology caused his advice to be frequently sought in matters regarding new equipment. In his hospital work nothing was too much trouble, and the care and attention that he gave to the aged and the needy were a reflection of his truly Christian outlook.

O'Day's interests were wide and varied, and being particularly interested in natural history, he carried out extensive research work on the physiology and comparative anatomy of the eye in various animals and reptiles. His other interests in music, literature and art in general made him an excellent conversationalist. At one time he was an enthusiastic and active member of the Victorian Chess Club. He was rather retiring and sensitive and had a lovable disposition; he was fortunate in having a family which was devoted to him.

DR. ANDREW BRENNAN writes: Kevin O'Day was a pioneer in this country on the study of the comparative anatomy, histology and pathology of the eye. He was deeply interested in research and spent much time over many years in his laboratory at St. Vincent's Hospital, advancing and extending the knowledge of this subject. Eyes from birds, fishes and animals were examined by him, and he was particularly interested in the study of Australian marsupials. This latter investigation was unique and of great value, and well deserved the widespread acclaim it received. An original and rapid method for the preparation of celloidin sections was perfected by him. This method saves much time and is a great improvement on previous procedures; it has been adopted by many histologists.

A great number of important articles were published by him both on comparative histology and on pathological conditions in the human eye. He also took a great interest in the application of eye bacteriology.

He was a fine and loyal friend, a keen student, a courageous critic and an untiring worker in the search for

knowledge. The medical profession has suffered a sad loss, and he will be greatly missed by his patients and friends.

DR. HUGH RYAN writes: Dr. Kevin O'Day's early death has left a great gap in the ranks of the Australian ophthalmologists. For over 30 years he exercised an increasing influence in ophthalmology, both as a practising ophthalmologist and as a teacher. He was keenly interested in the education of the young post-graduate, and he was one of the early advocates of a chair of ophthalmology at the University of Melbourne. It was with great pleasure that he saw one of his former students, Dr. Gerrard Crook, appointed to this chair. As a teacher he was lucid and didactic, but always ready to question and criticize theories unsupported by facts. His ophthalmology was built on the strong foundations of pathology, in which he was intensely interested, and in which he had achieved an Australia-wide reputation. This pursuit of morbid anatomy naturally led to his interest in morphology. He was a recognized world authority on the eyes of the Australian fauna. His other great interest was operative surgery, and week after week at St. Vincent's Hospital he performed long lists of operations. He was always ready to try new methods, and was one of the pioneers of the lamellar corneal graft in southern Australia.

His loss will be deeply felt by his colleagues.

DR. CHARLES BYRNE writes: My friendship with Kevin O'Day began 44 years ago at Xavier College. We had adjacent rooms at Newman College, were fellow students at St. Vincent's Hospital and graduated on the same day.

He had an extraordinary variety of interests. In addition to his speciality of ophthalmology, in which he was pre-eminent, he had a wide knowledge of English literature, European and ancient history, music and Christian apologetics. He was an excellent craftsman, whether at cutting sections, cabinet-making or photography. His approach to all subjects was never that of the dilettante, but always that of the perfectionist. In all he was helped by a very retentive memory and an active, inquiring mind.

During the whole of his career, even when he had reached the top of his profession, there was a complete absence of vanity. He remained as he was at school, cheerful, humorous, tolerant and, above all, kindly.

He enjoyed a very happy married life with a devoted wife, three daughters, and a son, Denis, whom he lived long enough to see graduate in medicine, like himself, with final honours.

DR. ARTHUR D'OMBRAIN writes: The death of Kevin John O'Day in Melbourne on June 6, 1961, was a sad loss to all who knew him and, for his quality as a man of undeviating integrity, loved him. The loss is even greater when looked at from an Australian and, indeed, from an international point of view, for his passing stilled the activity of a master mind in the field of human and zoological ocular physiology and pathology.

I have no doubt that the Ophthalmological Society of Australia will record his outstanding career in more detail; but I should like to pay a personal tribute, for besides having been a friend of Kevin and his family for many years, I was closely associated with him, over the past six years, in connexion with the Partially Blinded Soldiers' Association of Australia, to which I have the honour to be the Federal Honorary Ophthalmic Adviser. Kevin O'Day was the Victorian representative and did great work in furthering the interests of these unfortunate men, who risked their life and sight so that their compatriots might live and see. It will indeed be difficult to replace him, for his obvious sincerity carried great weight.

Dr. Peter English, of Brisbane, is the Queensland representative of the Partially Blinded Soldiers' Association of Australia.

Others who have helped the Association in various ways, particularly in the formation of an eye bank of over 1000, are the Sydney ophthalmic surgeons, Dr. Reuben Hertzberg and Dr. John Hornbrook. All regret the loss of Kevin O'Day's devoted services to the Association.

Also, the Federal President of the Association, Lloyd Johnson, Esq., J.P., and the Federal Secretary, Major W. Higson, E.R.D., on behalf of the Commonwealth Council of the Partially Blinded Soldiers' Association, wish to record their sorrow at the loss of such a supporter, and such a man.

The sympathy of us all goes out to Kevin O'Day's devoted wife and family.

Medical Matters in Parliament.

HOUSE OF REPRESENTATIVES.

THE following extracts from *Hansard* relate to the proceedings of the House of Representatives.

August 15, 1961.

Radioaction and Radioactive Substances.

MR. WHITLAM asked the Prime Minister, upon notice—

What action has been taken on (a) the recommendations by the National Radiation Advisory Committee in July, 1959, that the Commonwealth Government should seek the necessary powers to bring all uses of ionizing radiation in Australia under Federal legislative control as soon as possible, and (b) the detailed statement of its reasons which the Committee gave him at his request in July, 1960?

MR. MENZIES: The answer to the honorable member's question is as follows:

As I indicated in my reply to a similar question on 28th September, 1960, the recommendation gives rise to a number of complex problems. This matter is still being examined by the authorities concerned.

August 16, 1961.

Poliomyelitis.

MR. BIRD: I wish to direct a question to the Minister for Health. Is it a fact that, because of the shortage of Salk vaccine in Australia, the number of cases of poliomyelitis in the first seven months of this year was greater than the number for the entire twelve months of 1960? After an eight months' delay in the supply of the vaccine, when can the State health departments expect to receive further supplies of this life-saving essential?

DR. DONALD CAMERON: I cannot give the honorable gentleman the precise number of cases of poliomyelitis in Australia this year, but it is not large. However, he will be interested to know that about 160,000 doses of Australian-made Salk vaccine are expected to be ready for distribution by the end of the month. He probably knows that we have released recently a considerable quantity of Canadian Salk vaccine. In addition we expect to be able to liberate in the near future another 600,000 doses of Australian-made Salk vaccine. Whatever difficulties have existed in the manufacture and distribution of Salk vaccine—they have been quite considerable—we feel confident will be overcome completely in the very near future.

August 16, 1961.

Phenacetin Medicines.

MR. WARD asked the Minister for Health, upon notice—

1. Is he able to say whether the Swedish Board of Health has banned the unrestricted sale of pills and powders containing phenacetin?

2. Does this decision arise from medical research which has disclosed that there is a link between chronic kidney inflammation and a high intake of phenacetin medicines?

3. Are there a number of patent medicines and headache powders containing considerable quantities of phenacetin on sale in Australia?

4. If so, will he furnish a list of the medicines and powders which come within this category and state what action the Government proposes to take to protect the Australian community against this danger?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

1. I have been informed that in Sweden pills and powders containing phenacetin may now only be sold on medical prescription.

2. This course of action has no doubt been taken because there is evidence that the excessive and habitual use of phenacetin is associated with and may be responsible for chronic inflammatory conditions of the kidney. The toxic influence may however be an impurity in the phenacetin.

4. This is a matter for the authorities administering the Poisons Legislation in the several States.

August 22, 1961.

National Heart Campaign.

MR. DALY asked the Treasurer, upon notice—

1. Has the Government made any contribution to the National Heart Campaign Fund; if so, what was the amount of the contribution?

2. If no donation has been made, is it intended to make a contribution?

3. If a contribution has been made, has the Government any opportunity to examine the manner in which these funds are expended; if so, can he say what are the names, positions, salaries and allowances of any paid officials or organizers of the fund?

MR. HAROLD HOLT: The answers to the honorable member's questions are as follows:

1. As already advised in a written reply to the honorable member, the Commonwealth contributed £10,000 to the National Heart Campaign Fund, being the amount specifically sought of the Commonwealth by the National Heart Foundation. Because donations to the fund are deductible for income tax purposes, there would be an additional cost to Commonwealth revenue of up to £400,000 assuming an overall public response of £1,500,000.

2. See answer to 1.

3. The Commonwealth relies upon the high standing of the foundation's executive committee for the best use of donations to the fund.

National Health and Medical Research Council.

MR. WHITLAM asked the Minister for Health, upon notice—

Has a full-time Executive Officer been appointed for the National Health and Medical Research Council in accordance with the council's resolution last October?

DR. DONALD CAMERON: The answer to the honorable member's question is: No.

August 23, 1961.

Dentists.

MR. HAWORTH: My question to the Minister for Health concerns the alleged shortage of dentists in Australia. I ask: Is there a distinct shortage of dentists in Australia? If so, is it due to either of the reasons given by the New South Wales Minister of Health and the British Dental Association, both of whom suggest that the reason is financial, while the British Dental Association gives as an additional reason that more adequate experience is desired by Australian dentists? Or, finally, is it the most popularly believed reason—the attraction of the United Kingdom national health service?

DR. DONALD CAMERON: There is a very considerable shortage of dentists in Australia. I hesitate, personally, to think that the prime cause of it is financial. I do not really believe that people who take up a scientific profession do so, in the main, merely for the financial gain they can get out of it. I cannot, of course, tell the honorable gentleman all the causes of this shortage. It is quite true that a great deal of experience can be gained abroad. Members of both the medical and dental professions in this country frequently go abroad to gain experience, and I understand that quite a number of Australian dentists remain in England. Whether this is due to the attractions of the national health service in the United Kingdom I do not know. If it is, I suggest that the alleged statement, if it has been made, is probably an overstatement, because I cannot fail to think that there are many excellent opportunities for dental practice in this country.

Salk Vaccine.

MR. KEARNEY: I wish to ask the Minister for Health a question concerning the unavailability of supplies of Salk vaccine in New South Wales. Will the Minister investigate, as a matter of urgency, the claim that there is a shortage of Salk vaccine and the extent to which immunization activities conducted by the health departments of civic authorities are being seriously impeded and, in some cases, halted because of the lack of supplies? In particular, will the Minister inquire into the reason why a claim has been made that there is only sufficient vaccine at Wollongong for 1450 injections while about 5000 applicants are awaiting treatment? Finally, in respect of this issue, will the Minister take every action in his power to ensure that adequate supplies are made available throughout the State and to the health department of the Wollongong Council?

DR. DONALD CAMERON: The honorable gentleman will no doubt remember that I stated, in reply to a question in the House the other day, that it was expected that within the very near future there would be very large supplies of Australian Salk vaccine available and that in fact—I speak

from memory—about 160,000 doses would be available probably within a few days from now. The arrangements that are made for the distribution of Salk vaccine are that the Commonwealth Government distributes it to the State health departments, which arrange, within their own States, the order of priority and distribution either to local government authorities or to private practitioners, whichever they decide, in their own judgement, is best. Everyone regrets that there has been a shortage of Salk vaccine for some time, but it is expected that the shortage will be completely overcome in the near future.

Pensioner Medical Service.

MR. COPE asked the Minister for Health, upon notice—

How many age and invalid pensioners are debarred from receiving medical and pharmaceutical benefits due to means test on income?

DR. DONALD CAMERON: The answer to the honorable member's question is as follows:

There were 88,205 persons in receipt of age, invalid, widow and service pensions and tuberculosis allowances on 30th June, 1961, who had been issued with pensioner medical service entitlement cards. Separate figures for age and invalid pensioners are not available.

MR. COPE asked the Minister for Health, upon notice—

What would be the estimated cost to Consolidated Revenue if the age and invalid pension medical and pharmaceutical benefits means test was abolished?

DR. DONALD CAMERON: The answer to the honorable member's question is as follows:

It is estimated that the additional cost to the National Welfare Fund for a full year would be £1,410,000 if the pensioner medical service was extended to cover those pensioners in receipt of age, invalid, widow and service pensions and tuberculosis allowances who have not been issued with pensioner medical service entitlement cards.

National Health and Medical Research Council

MR. WHITLAM asked the Minister for Health, upon notice—

What requests or suggestions were made at the May meeting of the National Health and Medical Research Council for legislative and administrative action by the (a) Commonwealth, (b) Territories and (c) States?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

The following are the resolutions of the fifty-first session of the National Health and Medical Research Council, held in Melbourne on 25th May, 1961:

Resolution 1—Desiccated Coconut: That the Commonwealth Department of Health write to the Ceylon Coconut Board requesting an assurance that all shipments to Australia of desiccated coconut will be certified as having been produced under hygienic conditions, bacteriologically checked and found to be free from pathogenic organisms, and that consignments will be branded to identify the mill of origin.

Resolution 2—Traffic Injury Research: That a sub-committee should be formed expeditiously to investigate traffic accidents. The following were appointed: Dr. C. E. Cook or other officer of the Department of Health, Professor J. S. Robertson, Dr. J. Birrell, Dr. J. W. Lane, Dr. J. I. Tonge and Dr. R. A. Money (surgeon).

Resolution 3—Thyroid Tablets: That thyroxine be used in lieu of thyroid extract in thyroid tablets.

Narcotics.

MR. WHITLAM asked the Minister for Health, upon notice—

1. Do the model narcotics act and regulations recommended by the National Health and Medical Research Council in November, 1952, conform with the Single Convention on Narcotics signed by Australia last March?

2. In which States and Territories does narcotics legislation conform with (a) the model act and regulations and (b) the convention?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

1. The model narcotics act and regulations conforms largely with the terms of the Single Convention on Narcotics signed by Australia in March of this year. The differences are of a minor nature and are relatively unimportant under Australian conditions.

2. There are no major differences between the narcotics legislation of the States and either the model act and

regulations or the Single Convention. Minor differences will be the subject of discussion in the near future, when the Public Health Committee of the National Health and Medical Research Council meets on 30th October, 1961.

August 24, 1961.

Therapeutic Substances Act.

MR. WHITLAM asked the Minister for Health, upon notice:

When will the July, 1960, edition of the "British Pharmaceutical Codex" be gazetted under the *Therapeutic Substances Act*?

DR. DONALD CAMERON: The answer to the honorable member's question is as follows:

It is anticipated that the 1959 edition of the "British Pharmaceutical Codex" which came into force in the United Kingdom on 1st July, 1960, will be gazetted with effect from 1st November, 1961.

National Health Act.

MR. WHITLAM asked the Minister for Health, upon notice:

1. What additions and amendments have been made to the British Pharmacopoeia since the *National Health Act*, 1959?

2. When were they made?

3. Which of them have been gazetted under the Act?

4. When did they take effect for the purposes of the Act?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

1. There have been 49 additions and 42 amendments to the British Pharmacopoeia since the *National Health Act*, 1959. Details of these additions and alterations are listed on pages xii. and xiii. of the Addendum 1960 to the British Pharmacopoeia 1958.

2. These additions and alterations were official in the United Kingdom from 1st March, 1961.

3. and 4. These amendments have not been gazetted.

Hospital Benefits.

MR. WHITLAM asked the Minister for Health, upon notice:

1. What payments were made to registered hospital benefit organizations by their members in 1960-61?

2. What payments were made to, or in respect of, their members by the organizations in 1960-61?

3. What are (a) the reserves and (b) the operating expenses of the organizations?

4. How many persons are employed by the organizations?

5. How many claims qualified for (a) organization benefits and (b) Commonwealth benefit?

6. What was the average amount paid in (a) organization benefit and (b) Commonwealth benefit?

7. What were the principal reasons for refusing organization benefit and what percentage of claims was rejected for each of these reasons?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

1. Payments made to registered hospital benefit organizations by their members during the financial year 1959-60 amounted to £14,258,181. This figure includes payments made by Special Account members. Figures for the financial year 1960-61 are not yet available.

2. Payments of fund benefit to members (including payments made under Special Accounts) during the last two financial years were: 1959-60, £12,049,796; 1960-61, £14,150,756.

3. (a) The aggregate reserves of registered hospital benefit organizations were £11,184,701 at 30th June, 1960, to cover the contingent liability for benefits to over 7,000,000 contributors and their dependants. Details of the size of the reserves at 30th June, 1961, are not yet available. (b) Total operating expenses incurred by registered hospital benefit organizations for the financial year 1959-60 amounted to £1,667,614 including expenses charged to Special Account. Figures for 1960-61 are not yet available.

4. Details of the total number of employees of registered organizations are not available.

5. (a) During 1959-60, 826,847 claims qualified for organization benefits. For 1960-61 the figure was 883,901. (b) 942,293 claims qualified for Commonwealth benefit during 1959-60. For 1960-61 the figure was 1,028,457.

6. (a) The average amount paid per claim in organization benefit was £14 11s. 5d. during 1959 and £16 0s. 2d. in 1960-61. (b) The average amount paid per claim in Commonwealth benefits during 1959-60 was £8 7s. 8d. and in 1960-61 it was £8 13s. 10d.

7. The principal reasons for rejecting organization benefits and the percentage that the claims rejected for each reason represents of total claims qualifying for Commonwealth additional benefit were:

	1960-61	1959-60
(i) Hospitalization during the waiting period	0.8	0.9
(ii) The illness was in evidence at time of joining	—	0.1
(iii) Patient suffering from chronic illness	0.1	0.1
(iv) Maximum annual benefits previously paid	0.1	0.2
(v) The hospital was not recognized for fund benefit under the rules of the organization	38.1	34.9

Medical Benefits.

MR. WHITLAM asked the Minister for Health, upon notice:

1. What payments were made to registered medical benefits organizations by their members in 1960-61?
2. What payments were made to, or in respect of, their members by the organizations in 1960-61?
3. What are (a) the reserves and (b) the operating expenses of the organizations?
4. How many persons are employed by the organizations?
5. How many claims were (a) accepted and (b) rejected by the organizations during 1960-61?
6. What percentage of the cost of medical services for which claims were accepted was met by (a) the organizations, (b) the Commonwealth and (c) the contributors?
7. What were the principal reasons for rejecting claims and what percentage of claims was rejected for each of these reasons?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

1. Payments made to registered medical benefits organizations by their members during the financial year 1959-60 amounted to £14,388,964. This figure includes payments made by Special Account members. Figures for the financial year 1960-61 are not yet available.

2. Payments of fund benefit to members (including payments made from Special Accounts) during the last two financial years were: 1959-60, £11,893,354; 1960-61, £13,566,177.

3. (a) The aggregate reserves of registered medical benefits organizations were £6,454,463 at 30th June, 1960, to cover the contingent liability for benefits to over 7,000,000 contributors and their dependants. Details of the size of the reserves at 30th June, 1961, are not yet available. (b) Total operating expenses incurred by registered medical benefits organizations for the financial year 1959-60 amounted to £2,328,696, including expenses charged to Special Accounts; figures for 1960-61 are not yet available.

4. Details of the total number of employees of registered organizations are not available.

5. (a) Statistics according to claims are not kept but figures are available on the basis of individual services. In 1960-61 claims were accepted covering 19,998,730 individual professional services. In 1959-60 claims were accepted covering 19,447,401 services. (b) Fund benefit was refused in respect of 124,297 services in 1960-61 and 177,580 services in 1959-60.

6. The percentage of the cost of medical services for which claims were accepted, met by the organizations, the Commonwealth and the contributor is as follows:

	1959-60	1960-61
Organization	35.4	36.1
Commonwealth	28.2	27.3
Contributor	36.4	36.6

7. The principal reasons for rejecting organization benefits and the percentage that the services rejected for each reason represents of the total services qualifying for Commonwealth benefit were:

	1960-61	1959-60
(i) Service during the waiting period	0.20	0.10
(ii) The illness was in evidence at time of joining	0.07	—
(iii) Maximum annual benefits previously paid	0.05	0.01

August 29, 1961.

Influenza Vaccine.

MR. CLEAVER: I address a question to the Minister for Health: Is it a fact that United Kingdom authorities have established from statistics a direct relationship between influenza and accidents on the roads, at work and in the home? As influenza vaccine, which I understand gives 80 per cent. protection throughout the winter, could reduce the high incidence of accidents, particularly during epidemic periods, will the Minister urge industrialists to facilitate the vaccination of employees especially those engaged in transport duties?

DR. DONALD CAMERON: I do not know whether any relationship has been established between influenza and road accidents, but I think if you try hard enough you can establish all sorts of really unrelated facts about this kind of thing, and then attribute one thing to another. It is a fact that vaccines are now available in this country for the prevention of influenza. It must not be thought that they prevent all sorts of respiratory infections, such as the common cold. They do not. But they do afford a very large measure of protection against influenza itself, and inasmuch as they do that, they are, of course, of great value to industry. I think it has been made fairly clear over the last few years by the Department of Health and by the Commonwealth Serum Laboratories that these vaccines are available for those who want them.

August 30, 1961.

Lung Cancer.

MR. WHITLAM asked the Minister for Health, upon notice:

1. Has his department completed its statistical study of the incidence of lung cancer under different environmental conditions in Australia?
2. How far has the Australian College of Pathologists proceeded with its research into the influence of tobacco smoking on lung cancer?

DR. DONALD CAMERON: The answers to the honorable member's questions are as follows:

1. The statistical study is nearing completion and it is expected results will be published shortly.

2. Commencement of the research under the aegis of the Australian College of Pathologists has been delayed by difficulty in finding a suitable worker to undertake it. Work, however, has been commenced in the Pathology Department of the University of Melbourne.

August 31, 1961.

Commonwealth Serum Laboratories.

MR. HOWSON: I ask the Minister for Health: Is there any truth in a recent announcement that the Commonwealth Serum Laboratories have abandoned the production of penicillin and have reduced greatly the production of insulin because of competition from imports?

DR. DONALD CAMERON: I understand that a similar question was asked in the House yesterday during my absence. The short answer to the honorable member is "No". It is perfectly true that the Commonwealth Serum Laboratories have large stocks of insulin and penicillin and did suspend the production of both substances, but the reason for that action was not, in the main or, I think I could say even at all, because of imports. Even during the height of import licensing, importers of drugs had an over-all licence within which they could vary the quantities of the various drugs that they imported. So there was in fact no effective limitation of the amount of insulin or penicillin that importers could bring in at any time. There have been various factors that have accounted for the very large stocks held by the Commonwealth Serum Laboratories. One is that, with better techniques of production, they are now, and have been for some time, able to produce much larger quantities of both insulin and penicillin from the raw materials which they use for their production.

Another factor is that in the insulin field later types of insulin, the slow acting insulins, have replaced to a large

extent the type of insulin which was produced by the Commonwealth Serum Laboratory. Similarly, in the penicillin field, the new antibiotics—the newer penicillins—have largely replaced the conventional penicillins which were in use. As a result of these various factors, very large stocks were built up and it was only sensible that production should be suspended until those stocks could be diminished. In fact, it is rather interesting to notice that since the abandonment of import licensing, although not as a consequence of it, imports of both insulin and penicillin into Australia have fallen.

September 27, 1961.

Civilian Amputees.

MR. STOKES: My question is directed to the Minister for Social Services. Will he give consideration to some form of assistance to offset the cost of artificial limbs to those civilian amputees where amputation has not been due to an accident and the only Commonwealth benefit operating at present is that of taxation concession? I ask, further, whether it is possible for rehabilitation training in the use of an artificial limb to be extended by his department to persons in this category?

MR. ROBERTSON: I am well aware of the keen personal interest of the member for Maribyrnong in the vexed question of the physically handicapped. The honorable member knows that at the moment artificial limbs and other aids are available only to those who are accepted for rehabilitation under the *Social Services Act*. I would remind the House that there are rehabilitation centres in each of the six States and that they are rendering a great public service to those who are in need of assistance of that kind. I will be happy to give consideration to his proposals, but I am bound to point out that assistance in the procurement of artificial limbs is usually available in most of the States through other agencies of a charitable character.

September 28, 1961.

Health Committees.

MR. WHITLAM asked the Minister for Health, upon notice:

In respect of what committees appointed under the *National Health and Therapeutic Substances Acts* have the names of members been (a) announced to the public, or (b) revealed to the drug companies?

DR. DONALD CAMERON: I have not announced to the public or revealed to the drug companies the names of members of any committees appointed under the *National Health Act* or the *Therapeutic Substances Act*.

Pharmaceutical Benefits.

MR. WHITLAM asked the Minister for Health, upon notice:

How much (a) penicillin and (b) insulin was supplied as pharmaceutical benefits in each of the last two financial years?

DR. DONALD CAMERON: The answer to the honorable member's question is as follows:

Penicillin and insulin are prepared in a variety of forms and strengths and it is impracticable to calculate the quantities of these drugs contained in the preparations supplied to patients as pharmaceutical benefits.

October 4, 1961.

Hospitals Contribution Fund of New South Wales.

MR. E. JAMES HARRISON: My question is directed to the Minister for Health. I ask the Minister: Has he factual information establishing the truth or otherwise of the claim by the New South Wales Hospitals Association that the Hospitals Contribution Fund of New South Wales has £12,000,000 lying idle in reserves? Is the claim that the cost of administering hospitals in New South Wales increased by £2,000,000 to a total of £35,000,000 for the last financial year in accordance with fact? If such is the case, has the Government given any thought either to increasing the Commonwealth's hospital subsidy or, alternatively, of requiring the Hospitals Contribution Fund of New South Wales to adopt a more satisfactory disbursement of its reserves?

DR. DONALD CAMERON: The statement, which I have seen in the Press but have had from no official source, that the Hospitals Contribution Fund of New South Wales has £12,000,000 in reserves is, I understand, grossly wrong. As far as the cost of administering hospitals goes—and that is what I understand the honorable gentleman to be asking about—I point out that that is not a matter which is within the competence of my department, but is a matter for the State Department of Health.

Margarine.

MR. CLAY: My question to the Minister for Health is in two parts. First, does the Commonwealth have any power to control or decontrol the quantities of table margarine manufactured in Australia? Secondly, to assist sufferers from heart disease can the Commonwealth prescribe the proportion of saturated fat permissible in table vegetable margarine?

DR. DONALD CAMERON: The answer to both parts of the honorable member's question is, "No".

Quadruple Antigen.

MR. CHANEY: I ask the Minister for Health whether he has any information as to when the four-in-one vaccine will be available in Western Australia for distribution to the authorities who administer it to children.

DR. DONALD CAMERON: Some considerable time ago, when Salk vaccine was in plentiful supply, the manufacture of quadruple antigen, the vaccine about which the honorable member inquires, was commenced, and a large amount of it was made. It then came into use. Since then, as the honorable member knows, we have had Salk vaccine, which is one of the constituents of quadruple antigen. When supplies of quadruple antigen for, not only Western Australia but all States, were exhausted, advice was taken by my department from the National Health and Medical Research Council—I think I am right in saying that the Health Departments of all the States were also consulted—and a decision was made not to continue producing quadruple antigen until Salk vaccine was again in satisfactory supply. As the honorable member will know, we have recently released about 300,000 doses of Salk vaccine—not quadruple antigen, but Salk vaccine—to the States. We hope to have another large amount for issue about the end of the year and, depending on the maintenance of supplies of Salk vaccine, we will then get back to the supply of quadruple antigen. I regret that I cannot give any date when that will be done.

October 10, 1961.

Salk Vaccine.

MR. LUDOCK: My question is directed to the Minister for Health. Some government councils in my electorate are disturbed at the shortage of poliomyelitis vaccine, a shortage which could have a detrimental effect on the poliomyelitis immunization campaign. Is the Minister able to say what steps his department has taken to ensure that adequate supplies of the vaccine are available?

DR. DONALD CAMERON: Every possible step is being taken to ensure that adequate supplies of Salk vaccine will be available. The honorable gentleman will be aware that recently my department released 300,000 doses of the vaccine for use by the States. It is hoped that before the end of the year another very large supply will be available for distribution. As the honorable gentleman is aware, distribution of the supplies available is made in consultation with the States. The States then distribute their quotas to their local authorities.

Toowoomba Mental Hospital.

MR. SWARTZ: I address a question to the Minister for Health. Have arrangements been made to provide an anti-tuberculosis hospital for mental patients at the mental hospitals at Toowoomba, Queensland? Are these new hospital facilities being financed by a grant from the Commonwealth Government? If so, what is the amount of the grant?

DR. DONALD CAMERON: The construction to which the honorable gentleman refers is taking place under the tuberculosis arrangements with the State, and is part of a very large programme of hospital construction in Queensland, and, if my memory is correct, will cost about £240,000. This cost will be met, of course, by the Queensland Government. The project at Toowoomba is part of a chain of hospitals, including buildings such as the 500-bed hospital at Cherm-side and very substantial additions, in the form of fine, modern wards, to hospitals at Rockhampton, Townsville and Cairns and to another hospital at Toowoomba, which was opened, I think, two or three years ago. All these facilities are provided by the Commonwealth Government under the tuberculosis agreement with the State of Queensland.

Anti-Poliomyelitis Vaccine.

MR. JAMES: I address a question to the Minister for Health. It is supplementary to the question asked by the honorable member for Lyne. Has the Minister seen a report that the Sabin antipoliomyelitis vaccine, an oral

vaccine, is used in socialist countries with great success? Has the Department of Health considered using this vaccine in Australia?

DR. DONALD CAMERON: The honorable gentleman will, no doubt, be glad to know that the Sabin vaccine was developed in a capitalist country. I am very familiar with the name, and I know that Sabin-type vaccines have been widely used in various countries, including Russia. The question of the use of oral vaccines is not altogether simple, but we have been advised from time to time, both by the National Health and Medical Research Council, and by the Government's other advisers, on the use in Australia of oral vaccination. The Department of Health is, of course, constantly reviewing the use of both injectable and oral vaccines for the prevention of poliomyelitis.

Cortisone.

MR. WARD asked the Minister for Health, upon notice:

1. Is cortisone available as a pharmaceutical benefit for the treatment of certain acute forms of asthma?
2. Is it left to the judgement of the doctor to decide whether or not his patient requires cortisone?
3. If no, who does decide?

DR. DONALD CAMERON: The answers to the honorable gentleman's questions are as follows:

1. Cortisone is available as a pharmaceutical benefit for treatment of the acute form of asthma known as "status asthmaticus", when prescribed by a medical practitioner with the written authority of the Director-General of Health.
2. Yes.
3. See 2.

October 11, 1961.

Salk Vaccine.

MR. TURNER: My question to the Minister for Health relates to the shortage of supplies of Salk vaccine and the anxiety of mothers of young children arising therefrom. I ask the Minister whether specific inquiries have been made overseas with a view to augmenting supplies. If so, can he give details in the way of a convincing assurance that this avenue has been, and is being, thoroughly explored? Finally, can he say whether, if such supplies could be obtained, the vaccine would still have to be tested in Australia before being released, and whether diseases in animals or some other cause, at present holding up local production, would also make such testing at present impracticable?

DR. DONALD CAMERON: The Government has been very concerned over the shortage of Salk vaccine, and I think I can say that it has taken every possible step to make good that shortage. The honorable gentleman will probably recall that some months ago we imported a consignment of Canadian vaccine, when our local supplies turned out to be inadequate. We have recently been able to make available 300,000 doses which have been distributed to the States. We appointed an expert committee, under the distinguished chairmanship of Sir Macfarlane Burnet, to review our own testing and production methods and we have now in preparation another consignment of 600,000 doses of Australian Salk vaccine which we hope to make available before the end of the year. We have no reason at this stage, at any rate, to think that it will not pass the requisite tests. In addition, we have placed a further order overseas for more Salk-type vaccine in case our own supplies are again proved to be inadequate. However, it is not easy to get supplies from abroad because the main producing countries, Great Britain, Canada, the United States of America and Japan, have all had difficulties in the production of Salk vaccine. However, we are doing our best to augment our own supplies, and, as I say, some time ago we placed a further order for overseas supplies. With regard to the question of testing, the Government has always considered that, as it is responsible for issuing Salk vaccine for use in Australia, it should apply its own testing procedure in order to ensure, as far as it is possible to do so, that the vaccine is not only safe but potent. Therefore any supplies that we do import from abroad are subject to our testing procedure.

October 12, 1961.

Hepatitis.

MR. CLAY: I ask the Minister for Health: In view of the continued prevalence of infectious hepatitis with its frequently fatal effect upon its victims, nineteen sufferers

having died in New South Wales during the last three months, what steps have been taken and what progress has been made by the Commonwealth Department of Health in inquiring into the spread, prevention and cure of this dread disease?

DR. DONALD CAMERON: Infectious hepatitis is due to a virus which has not yet been isolated so that the problem of dealing with it is basically one of prevention in the public health field. Therefore, as the honorable gentleman will realize, the governmental measures necessary in this regard are chiefly those to be carried out by the State governments and local government authorities. All the information about this disease is readily available to those bodies, and the measures that they advocate are of course taken under the authority of the State health departments. Until the virus has been isolated there can be no specific treatment for the disease, and the best that can be done at present is the same type of treatment as used to be available before the organism of typhoid could be dealt with by inoculation; that is, general public health measures, personal cleanliness, care in the handling of food and so on. That is what is being done.

The Royal Australasian College of Physicians.

ELECTION AND ADMISSION OF FELLOWS AND MEMBERS.

At a meeting of the general body of Fellows of The Royal Australasian College of Physicians held in Adelaide on October 11, 1961, the following were admitted to fellowship of the College under Article 44: Dr. Ewan Murray-Will of New South Wales, and Professor Rupert A. Willis of Cornwall, England.

The following candidates, who were successful at an examination held in Australia, were admitted to membership of the College on October 9, 1961: Dr. Kurt Aaron, Dr. J. H. Casey and Dr. R. Gordon, of Queensland; Dr. R. B. Goldrick, Dr. R. W. Haber, Dr. L. B. Hardacre, Dr. C. I. Johnston, Dr. P. H. Miles, Dr. K. W. Perkins and Dr. M. C. Rozenberg, of New South Wales; Dr. Helen Byrne, Dr. J. H. Coldbeck, Dr. B. S. Gilligan, Dr. F. W. Gurr, Dr. Priscilla Kincaid-Smith, Dr. A. Kucers, Dr. J. A. Mirams, and Dr. W. B. Stephens, of Victoria; Dr. M. W. Begg, Dr. D. E. Dunn, Dr. M. W. Miller and Dr. D. N. Phear, of South Australia; Dr. P. M. Connor and Dr. S. S. Gubbay, of Western Australia.

Dr. J. V. Hurley, of Victoria, was admitted to membership of the College under Article 37.

EXAMINATION FOR MEMBERSHIP, AUSTRALIA, 1962.

THE following are the provisional dates for the examinations for membership of The Royal Australasian College of Physicians in 1962: First examination: written examination, capital cities, Friday, February 16; clinical examination, Sydney, commencing on or about Monday, March 26. Closing dates for applications: from candidates domiciled in Australia or New Zealand, Wednesday, January 17, 1962; from candidates domiciled outside Australia or New Zealand, Monday, December 18, 1961. Second examination: written examination, capital cities, Friday, June 22; clinical examination, Melbourne, commencing on or about Friday, August 3. Closing dates for applications: from candidates domiciled in Australia or New Zealand, Wednesday, May 23; from candidates domiciled outside Australia or New Zealand, Monday, April 23.

Applications to appear before the Board of Censors should be made in the prescribed form, and must be in the hands of the Honorary Secretary of the College before the closing date advertised. Candidates should signify in which city they desire to take the written examination. Only those candidates whose answers in the written examination have attained a satisfactory standard will be allowed to proceed to the clinical examination. Application forms are obtainable from the Honorary Secretary, The Royal Australasian College of Physicians, 145 Macquarie Street, Sydney.

Australian Medical Association.

SIGNING OF MEMORANDUM AND ARTICLES OF ASSOCIATION.

At the first meeting of the interim Federal Council of the Australian Medical Association, held at British Medical Association House, 88 L'Estrange Terrace, Kelvin Grove, Brisbane, on October 22, 1961, the Memorandum and Articles of Association of the Australian Medical Association were signed by the office bearers and other members of the Federal Council.

At the same time the Federal Council approved a draft agreement prepared by the Council of the British Medical Association in London covering affiliation of the Australian Medical Association with the British Medical Association.

The meeting will be more fully reported at a later date.

The members of the interim Federal Council are as follows: *Office Bearers of the Association*: President, Dr. H. C. Colville; Vice-President, Dr. A. J. Murray; Chairman of Federal Assembly, Dr. L. R. Mallen; Treasurer, Dr. W. F. Simmons. *Representatives of Branches*: Dr. R. H. Macdonald, Dr. E. F. Thomson (New South Wales); Dr. J. G. Johnson, Dr. T. G. Swinburne (Victoria); Dr. R. A. M. Miller, Dr. Charles Roe (Queensland); Dr. C. O. F. Rieger (South Australia); Dr. C. W. Anderson, Dr. D. M. Clement (Western Australia); Dr. L. N. Gollan, Dr. F. R. Fay (Tasmania). The General Secretary is Dr. J. G. Hunter, and the Assistant General Secretary is Dr. C. J. Ross-Smith.

The photograph on the right shows the Memorandum and Articles of Association being signed by the President of the Association, Dr. H. C. Colville. Others in the picture are (from left to right), Dr. J. G. Hunter, Dr. C. O. F. Rieger, Dr. C. W. Anderson, Dr. L. R. Mallen and Dr. E. F. Thomson.

The new Association will come into being as at January 1, 1962.



Photograph by courtesy of the Brisbane Courier-Mail.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Post-Graduate Conference at Young.

The Post-Graduate Committee in Medicine in the University of Sydney announces that, in conjunction with the Young Medical Group, a post-graduate conference will be held in the Board Room, Young District Hospital, on Saturday and Sunday, November 4 and 5, 1961. The programme is as follows.

Saturday, November 4: 2 p.m., "Tranquillizer Drugs", Professor R. H. Thorp; 2.30 p.m., discussion time; 2.45 p.m., "Prolonged Labour", Dr. W. McBride; 3.15 p.m., discussion time; 3.45 p.m., "The Clinical Assessment of New Drugs", Professor R. H. Thorp; 4.15 p.m., discussion time; 4.30 p.m., "Common Complications in Obstetrics and Gynaecology", Dr. W. McBride; 5 p.m., discussion time.

Sunday, November 5: 9.30 a.m., "The Newer Diuretics", Professor R. H. Thorp; 10 a.m., discussion time; 10.30 a.m., "The Endometrium in Infertility", Dr. W. McBride; 11 a.m.,

discussion time; 11.15 a.m., "Poisons and Antidotes", Professor R. H. Thorp; 11.45 a.m., discussion time; 12 noon, "Recurrent Abortion", Dr. W. McBride; 12.30 p.m., discussion time.

The fee for attendance at the course is £3 3s., and those wishing to attend are requested to notify Dr. G. C. Holt, Honorary Secretary, Young Medical Group, Box 184, Young, as soon as possible. Telephone: Young 4 or 157.

Post-Graduate Conference at Albury.

The Post-Graduate Committee in Medicine in the University of Sydney, in conjunction with the Border Medical Association, announces that a post-graduate conference will be held at the Albury Base Hospital on Saturday and Sunday, November 18 and 19, 1961. The programme is as follows:

Saturday, November 18: 2 p.m., registration; 2.30 p.m., "Common Neurotic Reactions", Dr. W. Brodie Grant; 4 p.m., "Diagnosis of Chronic Liver Disease", Dr. D. W. Piper.

Sunday, November 19: 10 a.m., "Omnipotence Dependence in General Practice", Dr. W. Brodie Grant; 11.30 a.m., "Modern Drugs of Proven Value", Dr. D. W. Piper.

The fee for attendance at the course is £3 3s., and those wishing to attend are requested to notify Dr. H. N. Meers,

Acute
Anchlo
Anchlo
Anchlo
Anthrax
Bilharzia
Brucella
Cholera
Chorea
Dengue
Distich
Diphther
Dysente
Enceph
Filariasis
Homolog
Hydatid
Infective
Lead Po
Leprosy
Leptospi
Malaria
Meningoc
Ophthalm
Ornithos
Paratyph
Plague
Polymy
Puerpera
Rubella
Salmonel
Scarlet F
Smallpox
Tetanus
Trachom
Trichom
Tuberculo
Typhoid
Typhus (i
Typhus (i
Yellow F

Honorary Secretary, Border Medical Association, 1080 Waugh Road, North Albury, as soon as possible. Telephone: Albury J.56.

ROYAL PRINCE ALFRED HOSPITAL: EAR, NOSE AND THROAT DEPARTMENT.

Seminar Programme, 1961.

THE staff of the ear, nose and throat department of the Royal Prince Alfred Hospital, Sydney, will conduct a seminar on the second Saturday of every month at 8 a.m. in the Scot Skirving Lecture Theatre. The main speaker will not exceed forty minutes, and there will be a discussion at the conclusion of his remarks. All medical practitioners and clinical students are invited to attend. At the next seminar, to be held on November 11, 1961, Dr. Mac Halliday will speak on "Nasal Polyp".

There will be no seminar in December, 1961, but the seminars will resume in January, 1962.

AUSTRALIAN VICE-CHANCELLORS' COMMITTEE.

Nuffield Dominions Trust: Appointment at Oxford Medical School.

THE Registrar of the University of Oxford has advised that nominations are now invited from Australian universities to fill one appointment in the Oxford Medical School from either May 1 or October 1, 1962, as preferred by the appointee. The appointment is one demonstratorship tenable in any one of the following departments: biochemistry (three-year tenure preferred); human anatomy; pharmacology; physiology (two-year tenure, with possible extension for a third year preferred). The appointment will be tenable for either two or three years, whichever is more convenient to the nominating university. Applicants are requested to

indicate clearly the period of appointment agreeable to their university.

Medical deans have been supplied with information on the main research topics current in these departments. Duties will commence on May 1 or October 1, 1962, or as soon thereafter as possible.

Conditions.

1. The qualifications for appointment to a demonstratorship shall be graduation at one of the Dominion universities and previous experience in research.

2. No person shall be appointed to a demonstratorship who does not intend that immediately after such appointment shall terminate he will return to the Dominion from which he was appointed for at least five years' work of a like nature as that carried out by him during his appointment.

Emoluments.

The stipend is £1150 (plus child allowances) for a married appointee, and £950 for an unmarried appointee (subject to payment of United Kingdom income tax).

The trustees have agreed, for the time being, to pay the cost of transport of appointees themselves, their wives and children under the age of 18, on the basis of economy class by air (or if travel by ship is preferred, cabin accommodation in the tourist class). The conditions of these payments are that the shortest route is taken and that no other body is assisting with transport costs.

Applications.

Letters of application, in duplicate, supported by the dean of the faculty of medicine in which the applicant trained or of the university with which the applicant is now associated, should be lodged with the Secretary, Australian Vice-Chancellors' Committee, c/o University of Melbourne, Parkville, N.2, Victoria, not later than Friday, December 8, 1961. Further information of the details and conditions of appointment under the Nuffield Dominions Trust may be obtained from the Registrar for each of the Australian universities.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED SEPTEMBER 30, 1961.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	3(1)	..	5(2)	1	1	..	..	..	10
Amoebiasis
Ancylostomiasis	2	..	2
Anthrax
Bilharziasis
Brucellosis	3(1)	..	..	..	..	..	..	3
Cholera
Chorea (St. Vitus)
Dengue
Diarrhoea (Infantile)	9(7)	2(2)	..	..	1	1	..	13
Diphtheria	1(1)	..	..	..	1
Dysentery	3(1)	..	1(1)	..	1	..	..	5
Encephalitis
Filariasis
Homologous Serum Jaundice
Hydatid
Infective Hepatitis	116(37)	95(46)	18(6)	27(14)	7(3)	8(5)	2	19	292
Lead Poisoning
Leprosy	4	..	4
Leptospirosis	1	..	..	..	..	..	1
Malaria
Meningococcal Infection	1(1)	..	..	..	..	..	..	1
Ophthalmia
Ornithosis
Paratyphoid
Plague
Polio-myelitis	3	1(1)	..	..	..	..	..	..	4
Puerperal Fever	1	..	..	..	..	..	1
Rubella	10(10)	4(3)	3(3)	3(2)	..	..	2	22
Salmonella Infection	1(1)	..	..	..	1
Scarlet Fever	1(1)	12(6)	1(1)	..	..	..	..	..	14
Smallpox
Tetanus
Trachoma	37(2)	..	..	..	37
Trichinosis
Tuberculosis	16(14)	14(12)	11(6)	6(6)	5(4)	8(6)	1	..	61
Typhoid Fever
Typhus (Flea-, Mite- and Tick-borne)
Typhus (Louse-borne)
Yellow Fever

¹ Figures in parentheses are those for the metropolitan area.

Notes and News.

Draft Standard for Bacteriological and Agglutination Test Tubes.

The Standards Association of Australia announces the issue for public critical review and comment of a proposal to adopt British Standard 625:1959, bacteriological and agglutination test tubes, as an Australian standard, without amendment. This standard specifies test tubes used in fermentation, agglutination and general bacteriological work. Fourteen sizes are provided by the specification and are available in a round-bottom form with either beaded or square tops. Two of these types are used for agglutination, one of which is in the "Dreyer" shape, having a tapered bottom and flared top. A test for free alkali is included as an appendix, and provision has been made for the tubes to be graded according to whether they pass this test or not. The special grade would thus be suitable in those cases in which alkali leached from the glass might affect the work, whereas the ordinary grade would be suitable for general bacteriological work. A recommended method for reconditioning tubes which have been stored is also included.

The proposal to endorse B.S. 625 is set out as Document 615, copies of which may be obtained from the headquarters of the Association, 157 Gloucester Street, Sydney, and from branch offices in the capital cities of all States and at Newcastle. Copies of B.S. 625 may be inspected or purchased at any office of the Association. Comment on Document 615 will be welcomed from interested users or manufacturers of this type of apparatus. Such comment should reach the Association before January 31, 1962.

Meeting of Medical Editors.

At a meeting of medical editors held in Adelaide on October 10, 1961, it was decided to form an Association of Medical Editors in Australia. The following office-bearers were elected: *Chairman*, Dr. S. R. Reader; *Secretary*, Dr. R. R. Winton.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Mackinnon, Ronald Marius, M.B., B.S., 1959 (Univ. Sydney), Royal Newcastle Hospital, Newcastle.

Petrauskas, Leonas Eugenijus, M.D., 1943 (Univ. Kaunas), D.T.M. & H., Sydney, 1957, registered under Section 17 (2b), *Medical Practitioners Act*, 1938 (as amended), General Hospital, Lae, Territory of Papua and New Guinea.

Szymczek, Aloysius Nicholas, M.D., 1934 (Univ. Budapest), D.P.H., Sydney, 1960, registered under Section 17 (2b), *Medical Practitioners Act*, 1938 (as amended), Ardlethan, 5S.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Burke, Brian Vincent, M.B., B.S., 1958 (Univ. Queensland), D.P.M., Melbourne, 1960; Cocking, Keith Josiah, M.B., B.S., 1959 (Univ. Sydney); Czerny, Cornel, M.B., B.S., 1961 (Univ. Sydney); Dissevelt, Gerardus Johannes, M.B., B.S., 1960 (Univ. Sydney); Heppell, Robert Rutherford, M.B., B.S., 1960 (Univ. Sydney); Humphry, Paul Stanley, M.B., B.S., 1956 (Univ. Sydney); Lee, Ang-Kim, M.B., B.S., 1959 (Univ. Sydney); Quilty, William Joseph, M.B., B.S., 1959 (Univ. Sydney); Toohey, John Joseph, M.B., B.S., 1960 (Univ. Sydney).

Deaths.

THE following deaths have been announced:

STANLEY.—Ronald Gordon Stanley, on September 10, 1961, at Bayshore, Trinidad.

LONGWORTH.—Roland Edward Longworth, on October 15, 1961, at Lismore, N.S.W.

Diary for the Month.

- OCTOBER 28.—New South Wales Branch, B.M.A.: Branch Meeting.
 NOVEMBER 1.—Western Australian Branch, B.M.A.: Branch Council Meeting.
 NOVEMBER 1.—Victorian Branch, B.M.A.: Branch Meeting.
 NOVEMBER 2.—South Australian Branch, B.M.A.: Council Meeting.
 NOVEMBER 3.—Queensland Branch, B.M.A.: Clinical Meeting in conjunction with the Mater Misericordiae Hospital Clinical Society.
 NOVEMBER 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 NOVEMBER 9.—New South Wales Branch, B.M.A.: Public Relations Committee.
 NOVEMBER 10.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): Medical Officers to Sydney City Council. All contract practice appointments in New South Wales. Members are requested to consult the Medical Secretary before undertaking practice in dwellings owned by the Housing Commission.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full data in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: 68-2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in Australia can become subscribers to the Journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £6 per annum within Australia and the British Commonwealth of Nations, and £7 10s. per annum within America and foreign countries, payable in advance.